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February 15, 1925
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Journal of Electricity

Devoted to the Economic Production and Commercial Application of Electricity
IN THE ELEVEN WESTERN STATES

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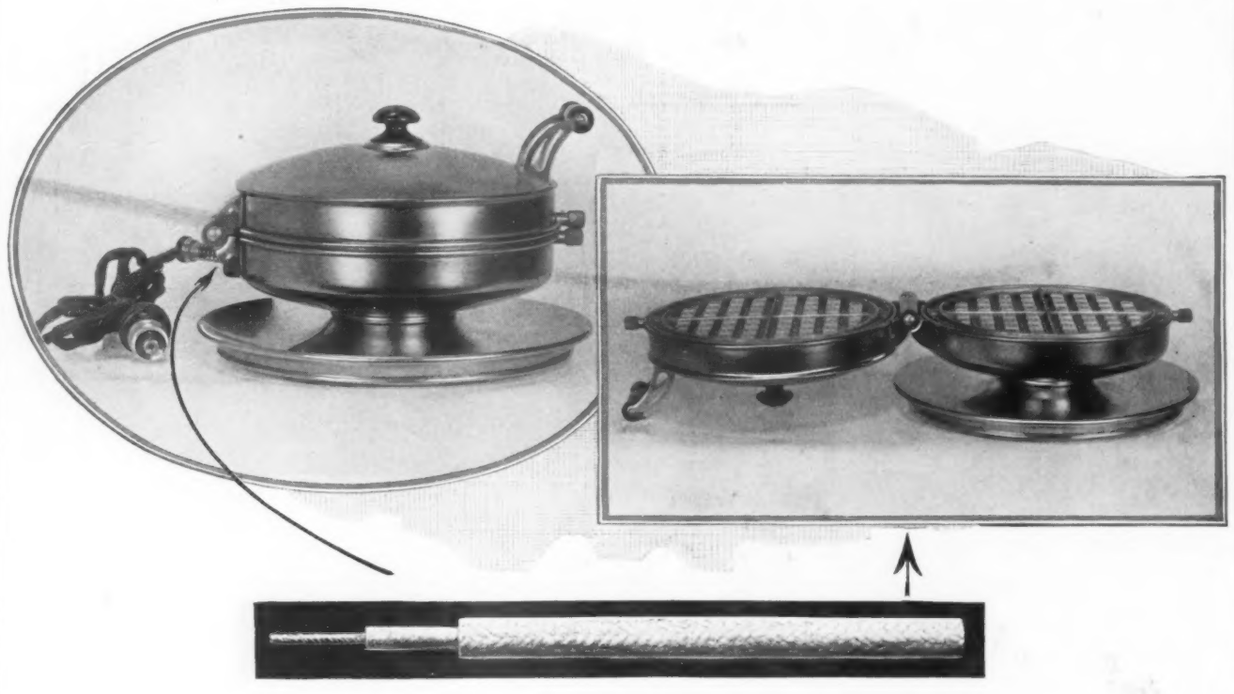

In the Majestic Electric Waffle Iron, made by the Majestic Electric Appliance Co. of San Francisco, there are two heating units, one in the cover and one in the base. They are connected by Rockbestos wire *through the hinge*. A severe test made of this wire---thirty operations per minute, continuously, the wire bending twice at right angles and twisting at same time. Mr. Milton H. Shoenberg of San Francisco, who conducted the test in his laboratory, writes:

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IN THE ELEVEN WESTERN STATES

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G. W. BARKER, Associate Editor
J. W. OTTERSON, Associate Editor

C. T. HUTCHINSON, Editorial Director
G. C. TENNEY, Managing Editor

G. R. HENNINGER, Associate Editor
B. H. SNOW, Northwest Editor

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Promoting the Widest Use of Electricity

THE extent to which Western central stations utilize the Journal of Electricity in their daily business affairs is typified by the following letter which has been received from the commercial manager of one of the large electric service companies:

To the Range Salesmen:

Under separate cover we are sending you a copy of the Jan. 15, 1925, issue of the Journal of Electricity. On page 65 you will find a description of an all-electric apartment house in Sacramento, Calif. This article should be of great value to you in assisting you to land apartment-house prospects, and we would suggest that you carry it with you as a regular part of your sales material.

Range Sales Manager.

At all times the Journal of Electricity strives to publish material which will be of use to all branches of the electrical industry in their daily business life. Special efforts have been made through its columns to foster and promote electric cooking, water heating and air heating. The above letter is one example of just how well the magazine is succeeding in its efforts. By utilizing the material presented from issue to issue in the Journal all branches of the industry have at their command a strong sales help.

Try this!
It's a real test.

Take a piece of DURADUCT a foot long and kink it into a spiral. Then toss it on the floor and stamp on it or grind it in with your heel.

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EDITORIAL

Closer Understanding Between Various Departments Is Needed

A lineman in one of our southern companies, after years of faithful and conscientious service, was promoted to the position of district agent for an outpost of the company for which he worked. Circumstances leading up to this promotion are not immediately important. For some years prior to the advancement this chap worked in his district as its jack-of-all-trades, attending personally to a multitude of tasks, carrying in his mind a knowledge of the entire system and serving in many diverse ways, morning, noon and many nights.

Yet his attitude remained essentially that of a lineman, which is to say, that of a craftsman. There were times when he might have been a bit uncomprehending of the demands made upon his craft by that group of fellow-workers known as the commercial department. There were times when the compromises asked of him in the interests of serving a customer who found it difficult to meet the necessary financial conditions, such as advance construction deposits, were not justified, in his opinion, and a let-down from the highest standards of practice in construction was never to be tolerated.

But since his has become the task, not only of planning the extension, but of selling as well, there has come to this craftsman a new angle of view. He has come to realize the relation between the financial consideration and the job, something he did not have to deal with formerly, and also he has gained an insight into the customer's peculiar difficulties which he had not needed to reckon with, particularly, before. Occasionally now, in matters of construction in which in former days, as a member of the engineering staff, he would have demanded the utmost in standards, he gets into a discussion with members of such departments, in which he is likely to say:

"Say, all you fellows can see here is a pretty line, with every insulator just so and every pole lined up with the north star, but by gosh, we fellows have to figure out how a farmer can get juice, even if we have to string the wires to him on fence posts."

This is not intended as a plea for the deterioration of standards as regards the most approved practices of construction,—far from it. It is true that construction can become an end in itself, instead of being a means toward that end. Occasionally there may be a tendency in this direction. Nevertheless, the best has proved cheapest in so many cases that it would be foolish, if not dangerous, or at least stupid, to advocate any lowering of construction standards.

There is room, however, for undstanding between construction, engineering, and similar departments, and those which have to deal more directly with the public—the commercial and even the securities departments of public utilities. Nothing will bridge this gap more effectively than a little experience gained in the respective fields of different departments by members of other departments.

It might almost be worth the trouble to see to it that every line foreman, at least, has a few weeks experience in the sales departments; and vice versa, every salesman a week or two in a line crew. In such circumstances neither would ask of the other what he had seen from actual observation to be rather impossible, and each would be more appreciative of the limitations of the other in his appointed work.

"Cheap" Appliances Are a Serious Menace

CONSIDERABLE apprehension has been expressed regarding campaigns which have been staged by the baking interests in various Pacific Coast cities in which cheap electric toasters have been featured. In one city nearly ten thousand of these appliances, in this instance of the "five and ten-cent store" variety, were sold in a single campaign.

The industry has reason to be apprehensive regarding the quality of these devices. They are substandard, and, like similar appliances which have been imported from Japan and Germany, they are unsafe. Devices of this character constitute a menace which the industry, for the most part, has been prone to overlook.

However, in the case of the toasters, some of the fears are unfounded. Is it not possible that the purchaser of the device, after using the electric appliance a dozen or so times and becoming acquainted with its convenience, will go to an electric dealer and purchase a standard appliance, when the cheap toaster burns out as it ultimately will? Chances are that the cheap device will perform an educational function from two different standpoints. In the first place, it will teach the purchaser to make toast electrically, and in the second place, it will give him some valuable experience in the folly of purchasing substandard appliances.

Most of the difficulty in these cases could be obviated if the industry would approach the baking interests with a cooperative plan, as has been done in

other cities, offering a special price concession on standard appliances for the opportunity of tying-in with the baking company's advertising. In any case, sincere efforts should be made to protect both the industry and the public from the dangers of cheap appliances which have flooded the market during the past year.

Orchard Spray—a New Field for the Electric Motor

AMONG the first of the results of the cooperative survey and study of the application of electricity on the farms of California which is being made by the committee on the relation of electricity to agriculture is the study on orchard spraying that appears on another page of this issue. In this article the authors outline a new field of application for the electric motor, a field of many possibilities for manufacturer and power company alike.

The writers of this article estimate that the total installed capacity of the orchard-spraying equipment on the fruit ranches of the state is approximately 30,000 hp., largely in gas engines of capacities ranging from 3 to 10 hp. each. They also estimate that the annual energy consumption of the spray outfits is approximately 10,000,000 hp-hr.

With the facts which are set forth in this article as a basis, manufacturers and electric service companies are in a position to make a further study of this subject with the idea of determining the exact extent of the possibilities in this field. Certainly it is a promising one, even if only a fraction of the present installations can be changed over to electric motor drive.

This one contribution of the committee is well worth the investment which the power companies have made toward the support of the movement. But the work has just started. We confidently predict that before the committee has completed its studies many profitable suggestions will have been made and many new fields of application uncovered. In addition to this, there will be a better understanding between the electric service companies and the farmers of their mutual problems.

And Now Electra in the Role of Iceman

DOMESTIC electric refrigeration promises to be one of the most important phases of the commercial programs of Western central stations during 1925. During the past few years so marked have been the developments and refinements in electric refrigerators that today the manufacturers of these devices are offering the electric service companies a standard appliance, reasonable in price, free from the complaints of the past and nationally advertised. It remains for the electric service companies to fit this appliance into their merchandising programs and place it on the same plane as the electric range.

Certainly domestic refrigeration is an attractive load. The capacity of the individual unit is so small as to require no additional investment on the power company's part for service. At the same time it is practically a 24-hour load so that the total monthly consumption of the individual customer is greatly increased. It is estimated that the average annual revenue from a refrigerator is from $30 to $40. Service costs on machines of the latest type promise to be extremely low.

From the standpoint of the customer, electric refrigeration offers many advantages. It is economical, the cost for energy being as low if not lower than ice. It is much cleaner than ice. It is more convenient. It has been proved that food placed in an electric refrigerator keeps better than in the ordinary type of ice box. Certainly the appliance has many sales arguments.

The West has the reputation of having the greatest degree of saturation of appliances of any other section of the country. There is no reason why the electric refrigerator should not have a place in the electrically equipped homes of the West equally as important as that of the electric range. With the power companies rests the task of adding the duty of iceman to the many duties which Electra now performs in the modern home.

Periodic Inspection of Domestic Appliances

SERVICING of the major domestic electrical appliances such as the range, refrigerator and some others, is logically recognized as a function of the central station. At the present time, however, this servicing is done only after a breakdown. Would it not be better to provide periodic inspection in order that the appliances be kept in good order and interruptions resulting from breakdowns eliminated insofar as possible?

Regular inspections could be made at definite intervals and could consist of an investigation of common sources of trouble toward the end that minor adjustments might remove the need for expensive repairs at some later date. Because the men comprising the inspection force would be more than mere inspectors, they should be fitting representatives of the company they represent. Their ability to meet the public should be the deciding factor in their selection.

The gain to the company sponsoring the inspection service might not be traceable in dollars and cents, but the investment would be returned many fold. By providing the most efficient service possible from the electrical devices in a housewife's home the company stimulates their further use and at the same time creates inestimable good will. The prospective purchaser of a range, water heater or refrigerator, knowing that a periodic inspection of these appliances would be made by the electric service company, would be more prone to buy. Then the inspector would also combine the qualities of a salesman with those of the electric service man. While making his visits to the home it would be a simple thing to determine the types of appliances in the home and suggest others. The need for convenience outlets, modern fixtures and wiring might be suggested by the inspector and prospects thus secured turned over to local contractors.

At first thought the expense of this inspection service might appear high. On the other hand, the return over a period of years would offset the money spent. The majority of the public is bound to appreciate the value of such service. The elimination of minor troubles in the electrical appliances in the home will increase its efficiency and use and add to the number of well-satisfied customers.

Service Suggestions
Stimulate Interest of Employees

SERVICE to the consumer is the keynote of the successful public utility. Improvements to service reflect themselves in more cordial relations between producer and consumer, and this in turn is bound to be reflected in prosperity for the company.

Electric service companies in general would do well to follow the lead of several of the transportation companies and some few of the electric utilities in encouraging greater cooperation from employees. Inspectors and those officially charged with the task of looking up small details which will result in more complete and satisfactory service being rendered are comparatively few in number, and necessarily so. Further, these individuals are usually overburdened and of course cannot keep in contact with everything at once. The so-called rank and file of general employees, on the other hand, always are in intimate contact with their particular branch and familiar with its shortcomings as well as its commendable features.

Monthly award of cash prizes of nominal amounts for the best and most practical suggestions for service improvements turned in by employees on the job serves two purposes. Not only does it result in bringing to the proper notice the valuable suggestions themselves, but also it stimulates each person toward taking a more personal interest in the work at hand. Several organizations have adopted this system and are finding that is paying dividends.

Fair Competition Brings
a Howl from the Jingoes

CALIFORNIA'S Jingo press is raising a howl of protest over the proposed Powers-Hartranft constitutional amendment which the legislature of that state has been asked to approve for submission to the people at the next election. The measure, which would tax publicly owned utilities in the same manner as privately operated properties, reads as follows:

"All property, works, plant and equipment owned, operated, managed or controlled by any city, city and county, county, district or other public agency, created and existing under and by virtue of the constitution and laws of this state, and held or used for supplying the public with light, power, heat, transportation or telephone service, shall be assessed and taxed in the same manner, to the same extent, and for the same purposes, as like properties held or used for like purposes by private corporations and natural persons are assessed and taxed under authority of this constitution and laws enacted pursuant thereto."

Opponents of this bill argue that it should not be passed because it would place publicly owned plants on an identical basis with private properties. They also argue that it would mean one government's taxing another. Both reasons are superficial. The fact of the matter is that the proposed amendment is sound and just. At present every government-owned utility, because it is tax exempt, is being subsidized by money extracted by other forms of taxation from the public's pockets. Refusal to permit taxation of such properties is a confession of weakness on the part of municipal-ownership proponents. For, if government ownership is a heaven-sent blessing as they would have one believe, why are its backers opposed to fair competition with private enterprises?

This Is an Age
of Progress

THERE has just come to the editor's desk an advertisement from a Canadian newspaper in which is advertised an air route from the end of a railroad in one of the provinces to a new mining district. The copy-writer in extolling the virtues of this new form of transportation says, "Out with the old, on with the new. From Larder City to Lake Fortune in twenty-five minutes. The comforts of a Pullman car at a speed of 120 miles per hour in the new Laurentide limousines. Enclosed cabin, six-seater, heated and nicely upholstered."

Twenty-five years ago such passenger service would have been considered impossible. But then twenty-five years ago there was no radio, horses did the work done by automobiles, and the electrical industry was but an infant. Truly we live in an age of progress.

DISCUSSION

Future of Cooperative Campaign Depends Upon Present Stand of Industry

To the Editor:

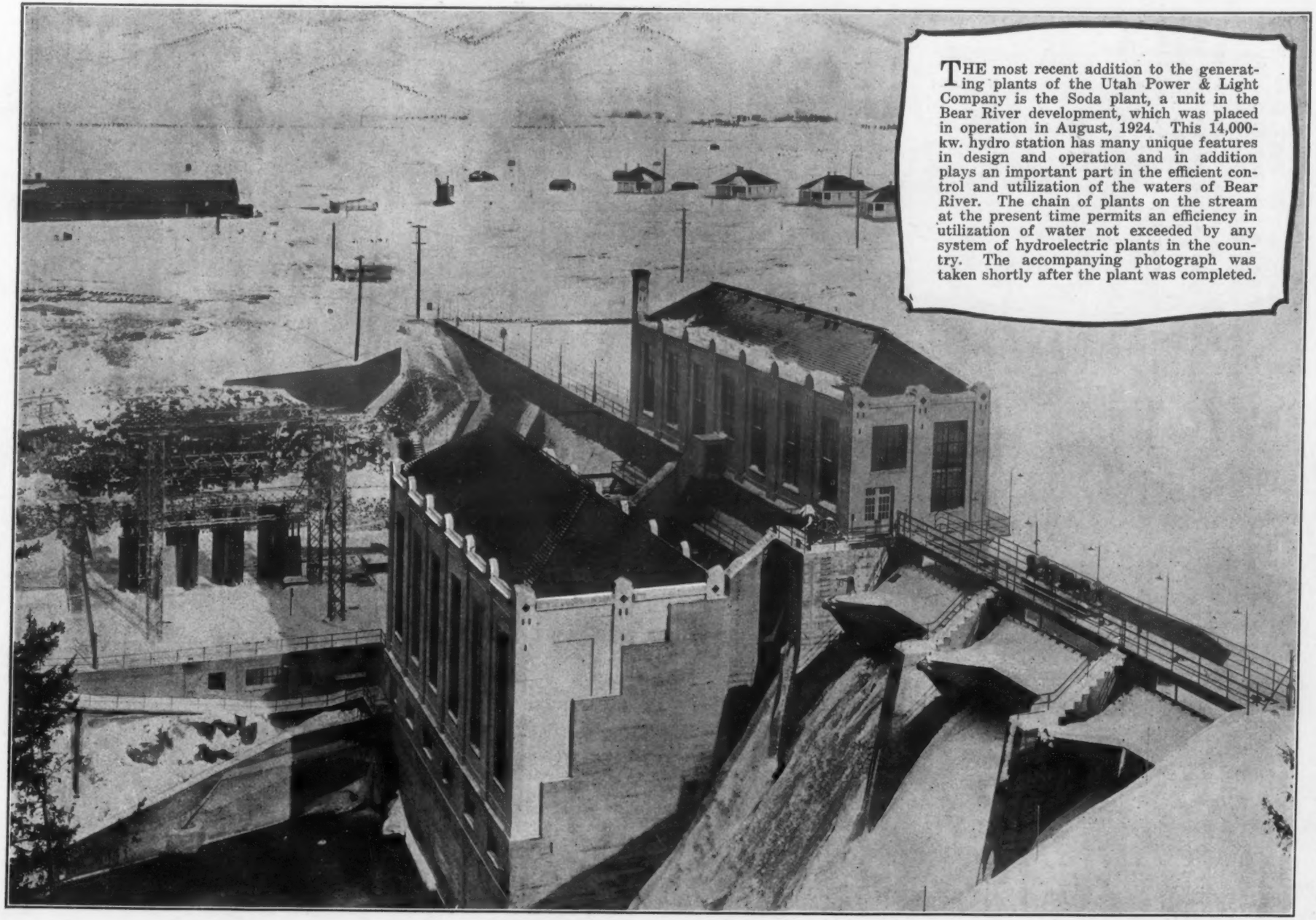
Sir: Your editorial in the January 15 issue of the Journal of Electricity, in regard to the California Electrical Cooperative Campaign, was read with keen interest and is deeply appreciated by me personally.

Truly the Cooperative Campaign is "up for consideration," and I believe its whole future depends upon the stand that is taken at this time. I am sure this editorial will do much to bring the electrical industry to the realization of the function of the Campaign and its possibilities, so that the whole country may continue to turn to California for leadership.

Please accept my most sincere commendation on this editorial and my best wishes for the continued success of your effective Journal.

R. E. FISHER,
Vice-President in Charge of
Public Relations and Sales.
Pacific Gas and Electric Company.

San Francisco, Calif.,
January 24, 1925.



THE most recent addition to the generating plants of the Utah Power & Light Company is the Soda plant, a unit in the Bear River development, which was placed in operation in August, 1924. This 14,000-kw. hydro station has many unique features in design and operation and in addition plays an important part in the efficient control and utilization of the waters of Bear River. The chain of plants on the stream at the present time permits an efficiency in utilization of water not exceeded by any system of hydroelectric plants in the country. The accompanying photograph was taken shortly after the plant was completed.

Details of the Soda Development of the Utah Power & Light Company

By L. B. Fuller

Construction Engineer, Utah Power & Light Company, Salt Lake City

DURING December, 1924, the Utah Power & Light Company placed in operation its 14,000-kw. Soda Plant on the Bear River. In addition to having many unique features in construction and operation, this station plays an important part in the entire Bear River development which now has a high degree of efficiency in utilization of water resources not exceeded by any system of water power plants. In this article Mr. Fuller describes the construction of the new plant and some of its operating features.

THE Soda development, completed during December, 1924, is the most recent addition to the large group of power-generating stations owned and operated by the Utah Power & Light Company. This new two-unit plant, with an installed capacity of 14,000 kw., brings the total installed capacity to 182,000 kw., somewhat over half of which is concentrated in a series of plants on Bear River. The Soda station is the fifth of the series and is located upstream from the older plants at a point 130 miles almost due north from Salt Lake City. Soda Point, from which it takes its name, is a mass of precipitous ledges forming the terminus of a northerly spur of the Wasatch Mountains and is a landmark of the old Oregon Trail.

From an engineering standpoint, perhaps the most interesting feature of the plant is the overhung-generator arrangement of the main units. The vertical main shaft with generator above and waterwheel below is not unusual, but the familiar water-lubricated lignum vitae turbine guide bearing has been omitted, and instead there is an oil lubricated babbitted bearing just above the turbine head cover. Immediately below the rotor of the generator there is a water-cooled Kingsbury thrust bearing resting on a four-armed thrust and guide bearing bracket carried by the circular walls of the wheel pit. The generator guide bearing is immediately below the thrust bearing. The turbine runner and generator rotor are both overhung, thus eliminating bearings above the generator stator and incidentally avoiding deterioration of generator insulation due to oil leakage which invariably takes place when bearings are located on top of the unit.

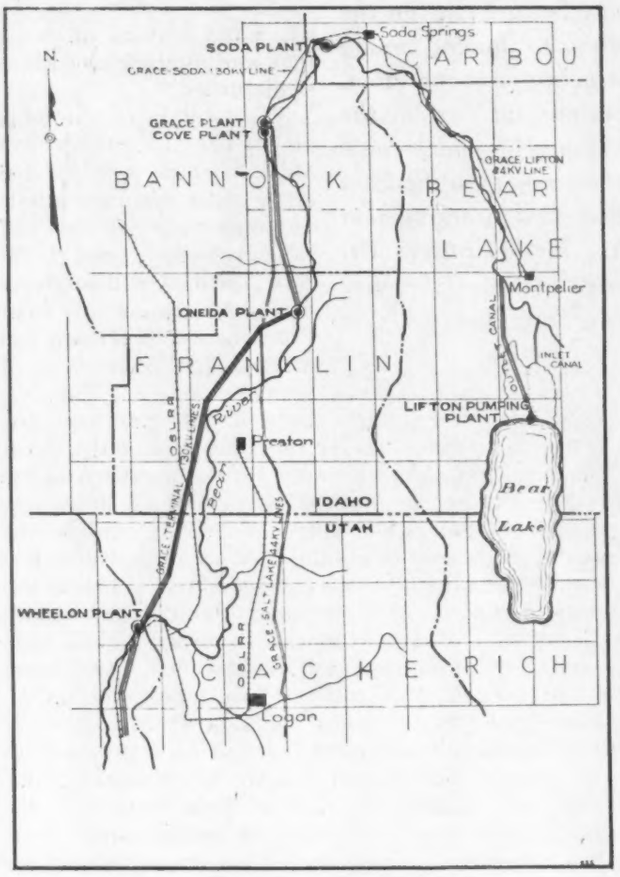
Ventilation is provided through perforations in the generator cover, and heated air is conveyed away by a plate-steel duct surrounding the generator and leading to the building exterior. Suitable dampers permit using the warm air for heating the station when desired. The rotor carries a diaphragm which prevents air going into the generator from the wheel pit. An advantage of this arrangement, which should not be overlooked, is the facility with which the rotor may be removed to permit cleaning or repairs to the generator. By simply removing the generator cover and detaching the rotor hub from the shaft, the rotor may be lifted out leaving all bearings and piping connections undisturbed.

The relation of the Soda plant to the Grace and Cove plants, which are located a few miles down stream, is an important feature of the development, and therefore it will be well to give a brief description of Bear River as now developed and utilized for production of electric energy. This remarkable river, which for a decade has been the principal source of power for industries of the Great Basin district, has its source on the northern slopes of the Uintah Mountains, at a point 60 miles due east from Salt Lake City. Following closely the west boundary of Wyoming it flows north 100 miles; thence pursuing a northwesterly course it enters the state of Idaho. At Montpelier, Idaho, it approaches the vicinity of Bear Lake, with which it has been connected for storage and regulation by two large canals. From Montpelier it continues still northwesterly about 35 miles to Soda Point. Here it reaches the northernmost point of its course and in fact touches the very edge of the Great Basin drainage area. Skirting the cliffs of Soda Point it angles sharply and flows south with occasional short westerly deflections. From Soda Point to the mouth on Bear River Bay of Great Salt Lake the distance is 80 miles. It is on this portion of the river that all the valuable power sites are located.

A few miles below the Soda plant, where the river formerly plunged into Black Canyon, a gorge 500 ft. deep cut in dense basaltic rock, the Grace dam now diverts the river into pipe lines by which it is conveyed 5 miles to a 44,000-kw. plant. The Cove diversion dam picks up the water again from the tailrace at Grace and by means of a 6,000-ft. flume it is made to generate 7,500 kw. at Cove. Neither the Cove nor the Grace plants have extensive storage. An open valley 25 miles in length intervenes between the Cove plant and Oneida Canyon. This canyon is 12 miles long, and at the midpoint is situated a 30,000-kw. installation. The Oneida dam is 125 ft. high and forms a reservoir of ample capacity. The

river next traverses Cache Valley and enters Bear River Canyon, a short precipitous gorge, which forms the site of the Wheelon plant of 7,500-kw. capacity, the oldest plant of the Bear River system.

Great as were the natural resources of Bear River as a source of water power, its value has been enormously increased by extensive development of storage facilities. No less than twenty years ago steps were taken by predecessor companies to divert the flood waters of the river into Bear Lake, but it was not until about 1916, after the construction of the Lifton pumping plant and the completion of the present large inlet and outlet canals, that the effect of annual and seasonal fluctuations was practically eliminated.



Map of the Bear River development of the Utah Power & Light Company showing the locations of the various hydro plants and Bear Lake.

The power streams, however, of the Intermountain region are not only subject to the variations due to increase and decrease of precipitation from year to year and to seasonal fluctuations, but are also extensively affected as to their constancy at any individual power-site location by local weather conditions. During winter months the choking of channels by anchor ice, which forms with great rapidity due to sudden low temperatures in the high plateau and mountain regions, often has severe localized effects. On the other hand, sudden raising of temperatures often has localized effects of increasing stream flow by melting of snow and ice, which, in the absence of distributed storage facilities along the length of developed portions of the streams, result in a net loss of the annual available power.

Nature has fixed the location of the large and important plant at Grace, the most important in fact of the entire Bear River system, at a distance of 50 miles by river and canal from the Bear Lake reservoir and thereby subjected it to some short-duration disturbances in the constant flow it would have had if the intervening waterway could have been eliminated. The Cove plant was similarly situated in this respect, while on the other hand the Oneida and Wheelon plants had the advantage of the large regulating reservoir at Oneida.

At present, however, with the great Bear Lake reservoir at the head of the system to absorb annual and seasonal fluctuations and the Soda and Oneida reservoirs to absorb fluctuations due to weather effects along the course of the river as well as to provide for daily load fluctuations, the system reaches a high degree of efficiency in utilization of water resources and attains an adaptability to service requirements probably not exceeded by any system of water-power plants. The Soda development must therefore be regarded not only as an important addition to power-plant capacity, but as a reservoir project the construction of which has been one of the final steps in perfecting the reliability and constancy of Bear River power.

Construction Items

Excavation at the Soda site began July 1, 1923, and the first unit was placed in operation Aug. 1, 1924. The plant is located in a grazing and agricultural district so that it was necessary to provide housing and boarding facilities for practically the entire construction force as well as buildings for shops, offices and storage of materials. This undertaking involved the construction of 75 temporary buildings from the size of mere cottages and bunk houses to buildings having 8,000 sq. ft. floor space, and was carried out along with the assembly of construction-plant facilities and equipment in the spring months of 1923. One mile of standard gage railroad construction was necessary to bring freight into the camp. A 10-ton cableway was used to span the gorge at the dam location for handling and placing derricks, engines, pumps, etc., as well as structural steel and heavy materials.

The excavation and embankment work at the plant and about the reservoir amounted to more than 150,000 cu. yd., a large portion of which had to do with relocation of roads made necessary by the flooding of former road locations. Five hundred tons of reinforcing steel and 700 tons of structural steel were used. Sixty thousand cu. yd. of concrete aggregates were required. No materials which can be used in the natural state for concrete exist in the vicinity. The rock at the site is not satisfactory for concrete, and all deposits of sand and gravel require treatment of some sort. Eighty per cent of the aggregates was transported 20 miles by railroad, and the remainder was brought from a distance of 45 miles. A crushing, screening, washing and storage plant was erected on the works capable of treating

500 cu. yd. per day. Storage to the extent of 15,000 cu. yd. of aggregates and 6,000 bbl. of cement was at times maintained to insure against delays due to car shortage and transportation difficulties.

Aggregates were conveyed to the mixing plant by 1½-yd. side-dump cars of 3-ft. gage. A heavily timbered twin tunnel was constructed under the stock piles, one compartment being used for the return of empty cars. Precise measurement of sand and coarse aggregates was accomplished by batchers hung in the roof of the loading tunnel. The aggregate cars dumped directly into the charging hoppers of two 28-cu. ft. non-tilting mixers set at an elevation of about 20 ft. above the highest part of the dam. Primary distribution of mixed concrete was by 2-yd. side-dump steel cars propelled by gasoline locomotives. Secondary distribution was by hoppers feeding line chutes and counterweight chutes. The long, severe winter of this locality with temperatures at times reaching — 30 deg. F., hampered the concrete construction work and necessitated temporary housings of great extent as well as heating of all concrete materials.

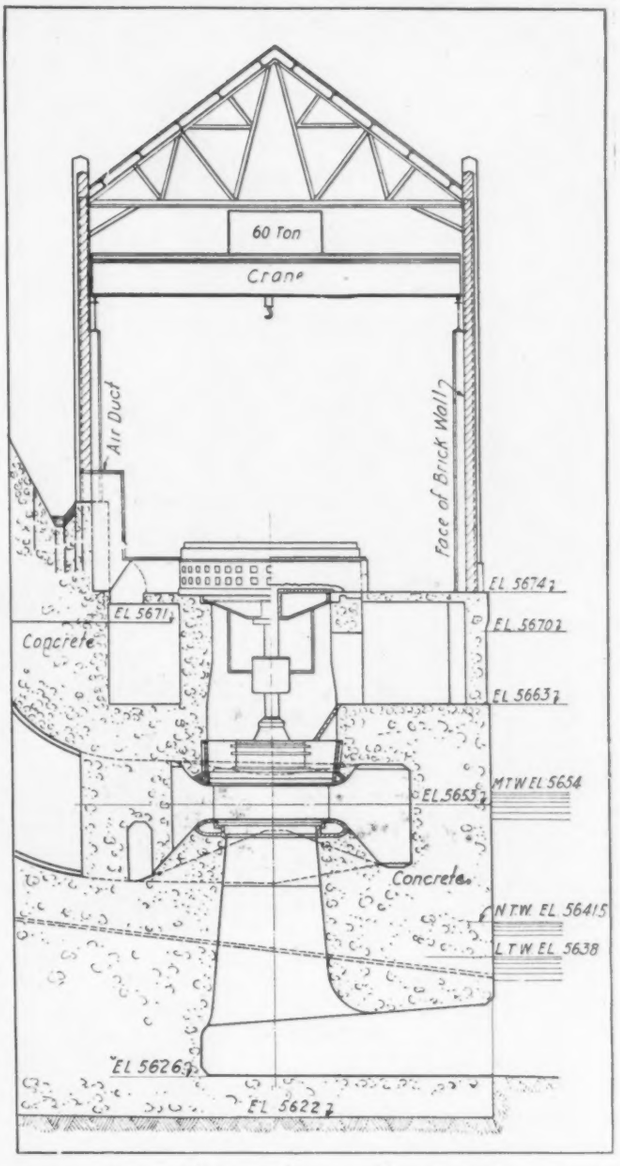
The unwatering was accomplished by diverting the river into a large wooden flume 26 ft. wide by 8 ft. high. After the foundations had been completed from the north bank to considerably past midstream, the river was diverted into sluices left in the concrete for the purpose. The diverting flume was removed and the remainder of the foundations placed. Unwatering operations were difficult because of the great fluctuation of water level caused by ice jams during the winter months that at times raised the water 15 ft. or more and to a height of 35 ft. above the deep foundations.

General Arrangement

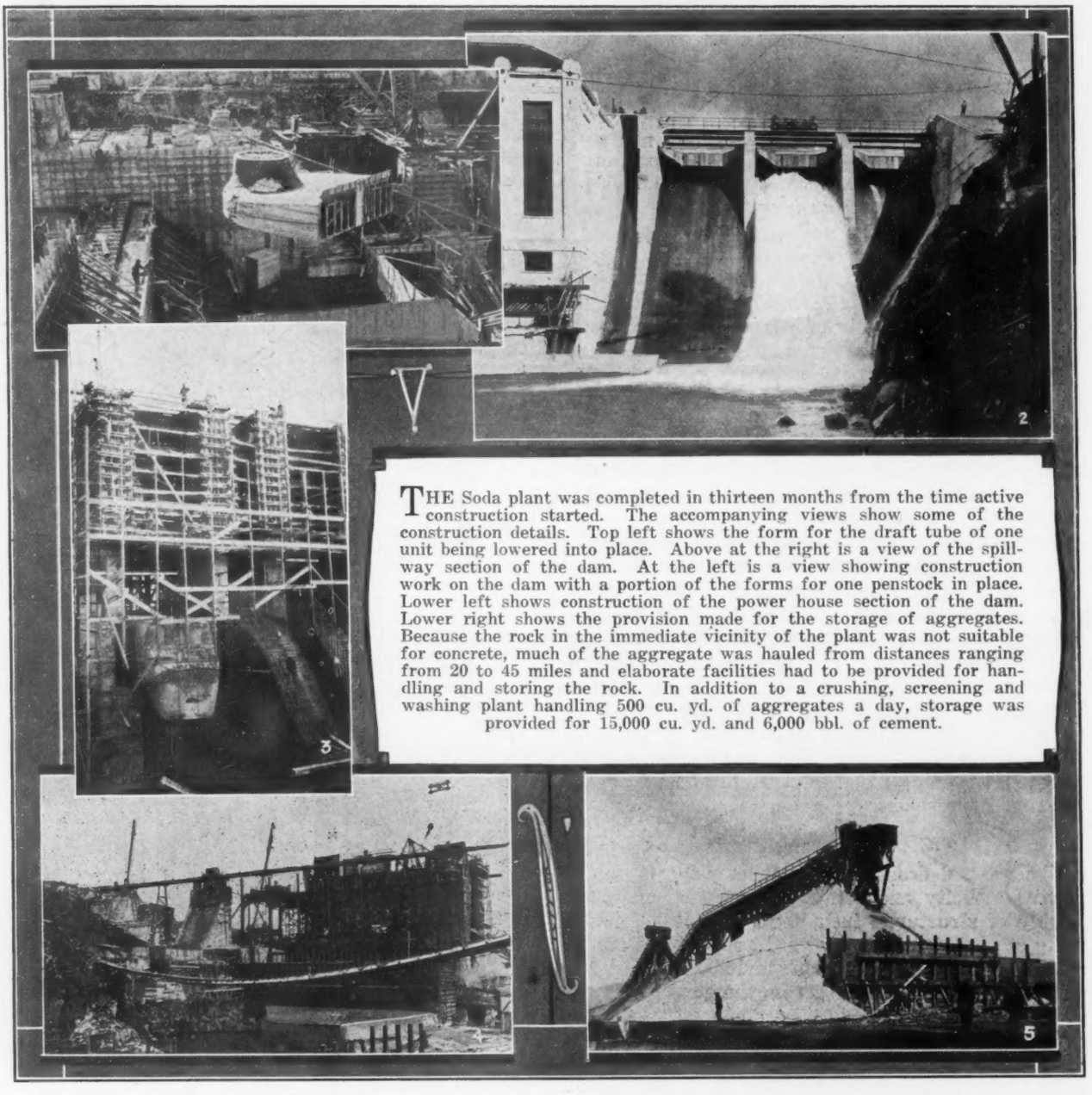
The general design of the Soda plant is one of great simplicity and compactness. The entire assembly of structures, including dam, intake, generating station, transformer yard and tailrace are located upon an area 530 ft. long and 200 ft. wide. The dam, which cuts squarely across the gorge, is of the gravity type and of solid concrete construction except at the south end where an earth embankment is used. The foundation for the concrete portion is solid rock, which in midstream is at El. 5,620. The total length is 530 ft. with a maximum height of 105 ft. The crest of the dam is at El. 5,725, while the reservoir surface is 5 ft. lower. Extending upstream 6.5 miles, the reservoir covers an area of 1,200 acres and affords a storage capacity of 16,000 acre-ft. From maximum reservoir surface to elevation of tail water the fall is 80 ft., but under normal operating conditions the reservoir will usually be kept 2.5 ft. lower so that the operating head will be 77 ft.

Features of Dam

Beginning at the extreme north end, the first section is 243 ft. long. The top width is 10 ft. The upstream face is vertical, and the downstream face is vertical for 10 ft. with a batter of 6⅜ to 12 below. The maximum height in this portion is 70 ft. The power-house section of the dam is of similar cross-section but of more liberal dimensions to compensate for the large waterways extending through it. This section is 109 ft. long and extends considerably past midstream. The spillway section is 114 ft. long and extends from the power-house section to the abutment walls on the south bank. The section is of the usual ogee shape with curved crest and concave bucket or apron at the toe. From the abutment walls to the junction with the hillside there is a broad embankment of puddled earth 67 ft. long. An inspection gallery 4 ft. wide and 7 ft. high accessible from manholes in the power house foundations extends throughout the portion of the dam where the height is 50 ft. or more. This gallery is within 5 ft. of the upstream face and vertical 4-in. pipes on 25-ft. centers extend down to bedrock where they connect with vertical holes drilled 25 ft. deep in the rock. Seepage water is thus collected and drained away to avoid hydraulic pressure under the dam.



Cross-section of the power house section of the dam showing generator and turbine.



THE Soda plant was completed in thirteen months from the time active construction started. The accompanying views show some of the construction details. Top left shows the form for the draft tube of one unit being lowered into place. Above at the right is a view of the spillway section of the dam. At the left is a view showing construction work on the dam with a portion of the forms for one penstock in place. Lower left shows construction of the power house section of the dam. Lower right shows the provision made for the storage of aggregates. Because the rock in the immediate vicinity of the plant was not suitable for concrete, much of the aggregate was hauled from distances ranging from 20 to 45 miles and elaborate facilities had to be provided for handling and storing the rock. In addition to a crushing, screening and washing plant handling 500 cu. yd. of aggregates a day, storage was provided for 15,000 cu. yd. and 6,000 bbl. of cement.

The spillway has an effective length of 96 ft., divided into four openings by reinforced concrete piers. The piers support a bridge and form the anchorages and jambs for the large Tainter gates on the spillcrest. The sill of the spillway gates is 12.5 ft. below maximum reservoir level, and each of the three main openings is 30 ft. in width. An auxiliary opening 6 ft. wide equipped with a dropgate is provided for a trash and ice spill. A portable double-drum electrically driven hoist is provided for raising the gates, each gate being provided with hoisting chains which can be quickly attached to the drums as the hoist is propelled along the track on the bridge by means of a hand-driven propelling gear. The ice gate is operated by means of a stationary double-drum hoist also electrically driven. Air pipes embedded in the crest of the dam provide a supply of compressed air to prevent ice formation in front of the gates.

Intake

On the upstream face of the dam seven vertical piers or walls 5 ft. thick and 15 ft. wide in a direction parallel to the stream extend from bedrock to the top of the dam. These piers form the sidewalls of the intake passages. They carry at El. 5,670, a heavy concrete slab which forms the floor of the intake. At the top they carry another slab which is the floor of the gatehouse. The walls are so spaced as to guide the water directly into the passages molded through the dam that connect with the turbines. The passages or penstocks are 12 ft. in height, and each main turbine is fed by two penstocks, one 16 ft. wide and the other 8 ft. wide, both being of rectangular cross-section. There is also in the intake

a 12 x 16-ft. passage leading to a discharge valve with a branch waterway for the exciter turbine. There are five electrically operated sluice gates, two of which are 8 ft. x 12 ft. and three 16 ft. x 12 ft. The gates are mounted on steel rollers working in steel-lined slots in the intake walls. Each gate has two screw-threaded stems 42 ft. in length. All intake openings are protected by movable bar screens, and these have a compressed air system for cleaning. The gate house is 117 ft. long x 30 ft. wide and 37 ft. high. It has a structural steel frame with walls of terra cotta tile covered on the outside with Portland cement plaster, the finishing coat being pure white. The roof slab is of nailing concrete covered with copper shingles finished in a mottled green color. The building has a 10-ton crane equipped with an electric hoist.

Power Station

The substructure of the power station is integral with the dam. In it are molded the draft tubes and scroll cases of the turbines. The substructure contains the first and second floors. The third floor is at the top of the substructure at El. 5,674. The first floor is of small extent between the turbines and used solely for governor oil tanks. The second floor, the most important in the station, is at El. 5,663. On this floor are located the operating room, switchboard, control apparatus and most of the auxiliary equipment. On the third floor the generators, bus-structure and station-service transformers are located. The superstructure is 109 ft. long, 40 ft. wide and 44 ft. to the cave. The construction is similar to the intake house, the walls being finished in white cement with green copper roof. Sliding steel sash windows are used, and at the north end a large Kinnear door permits the transformers to be brought in for attention and repairs. A boiler plant housed in a concrete compartment under the switchyard furnishes steam for station heating and various uses about the dam and intake.

Equipment

The Soda station has two main units and two exciter units. There is also a 62-in. Type "N" Johnson hydraulic regulator used for maintaining a flow for downstream stations at times when the main units are not running and the spillway is not in use. There are four single-phase transformers (one a spare) of 5,000-kw. capacity each for stepping up

Third floor of the power house showing generators and method of housing. At the right are the air ducts for cooling the generators.

from generator voltage to the transmission line voltage, which is 132 kv. A four-panel bench-board of familiar type is provided for control of the main generator and transformer circuits. The auxiliary apparatus includes service water and fire pumps, air compressors, storage battery, etc. No central lubrication system is provided since all important bearings have self-contained circulating pumps and reservoirs. A 60-ton electrically operated Whiting crane with a 10-ton auxiliary hoist spans the clear width of the power house.

The two main turbines of 10,000-hp. capacity each were supplied by the Allis-Chalmers Manufacturing Company. They are designed to run at 150 r.p.m. and to give good efficiencies over a wide range of operating heads. The governor heads are carried by the turbine main shafts. Each governor has its own rotary pump and accumulator tank, which are cross-connected for convenience in making repairs. The 7,000-kw. 6,600-volt generators were furnished by the General Electric Company, as were also the 200-kw. 250-volt exciters, one of which is driven by an induction motor and the other by a 260-hp. 500-r.p.m. steel spiral-cased water wheel supplied by S. Morgan Smith Company. This turbine has a belt-driven Woodward Type HR governor.

In very few hydroelectric plants has centralization of control and general convenience of operation been so completely carried out and perfected as in the Soda station. The operator can, without taking more than two or three steps from his regular station before the switchboard, open and close intake gates, start and stop the units or place the large outflow valve in operation. From a point in front of the benchboard he can observe temperatures of bearings, generator windings and even the power transformers in the switchyard. He can read at a glance the elevations of water in the reservoir, tailrace and at the rear of the intake screens. The position of each important gate and valve as well as the opening of the turbine wickets is indicated in the control room. Periodical inspections of the auxiliary apparatus, operation of disconnecting switches in the bus structure, or at the high-voltage transmission line terminal, are the only ordinary operating steps to require his absence from the switchboard room. Except for accident or unusual condition of some sort, the single switchboard operator requires no assistance in the operation of the entire plant.

Switchyard

The switchyard is located just west of the power station. The arrangement is compact and simple, consisting of a foundation for the transformers and a single bay steel switching structure. The only high voltage switching facility provided is a gang-operated air-break switch, diconnecting the one outgoing line from the transformers. The structure has been so designed, however, that a second outgoing line may be added and a high voltage oil circuit breaker inserted in each out-going circuit. High voltage lightning arresters have been omitted. The low-voltage power cables from the power station to the transformers are three-conductor lead-covered, several operating in parallel.

Twenty Years Ago

(Editor's Note.—The material in this column is taken from the Journal of Electricity, Power and Gas, predecessor of the Journal of Electricity. Twenty years ago was chosen arbitrarily because the events and personalities of that period of the electrical industry are within the memory of many of those engaged in the industry today.)

February, 1905.

The North Mountain Power Company of San Francisco has recently completed a modern 1,500-kw. hydroelectric power plant to serve Humboldt Bay and Eureka. It is a 25-cycle installation, and is therefore primarily a power rather than a lighting plant. Although there are lighting loads to carry, the frequency for such service is raised through motor-generator sets to the usual 60 cycles. The cost of raising the periodicity from 25 to 60, wherein only a small proportion of the total output goes into lighting, would clearly enough involve a less financial loss than that arising from a complete 60-cycle installation with its inherently poorer characteristics and generally inferior power service.

Each hydraulic unit, of which there are two, consists of a pair of 44-in. Pelton-type special disc wheels under one sheet steel housing. The electrical apparatus consists of two 750-kw., 500 r.p.m., 25-cycle, three-phase, Bullock generators, generating at 2,200 volts. Energy is transmitted 70 miles to a substation at Eureka at 33,000 volts. The auxiliary steam plant at Eureka consists of one horizontal, tandem compound, condensing, gridiron valve, McIntosh & Seymour engine, having a nominal capacity of 700 hp. The steam plant installation was made by Chas. C. Moore & Company, Engineers, Inc. J. C. Ralston, Spokane, is chief engineer, J. B. Rogers, San Francisco, assistant engineer in charge of construction, and H. L. Jackman, general superintendent of the company.

The San Francisco branch of the American Insttute of Electrical Engineers was organized on Jan. 20, 1905, by the election of the following executive committee: George O. Squier, C. L. Cory, F. V. T. Lee, J. A. Lighthipe, A. H. Babcock.

Arrangements are being perfected for the National Electric Light Association convention at Denver and Colorado Springs during the week of June 6.

The California Gas and Electric Corporation has ordered from the Stanley Electric Manufacturing Company two mammoth frequency changing outfits of 5,000 kw. each. These outfits are for use in connection with the contract which the corporation has secured from the United Railroads of San Francisco, and will change the 60-cycle current from the Bay Counties line to 25 cycles for further distribution to the railroad company's substations.

Electric Power for Orchard Spraying

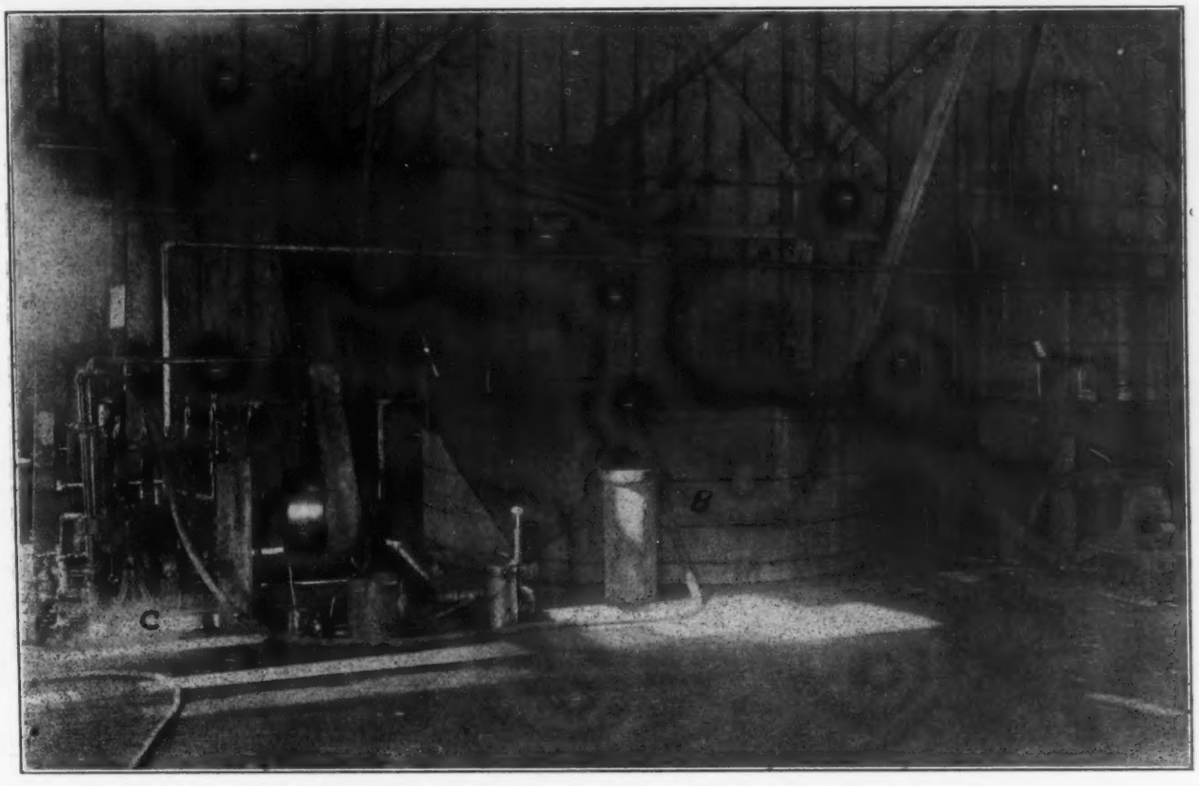
By B. D. Moses and W. P. Duruz
College of Agriculture, University of California.

WITH the development of stationary spraying plants for the orchards of California a new field of application for the electric motor is presented. It is estimated that the total power consumption required for spraying is ten million horsepower-hours, most of which is now done with gas engines. In this article the authors discuss the possibility of the adaptation of electric motors to this phase of agriculture.

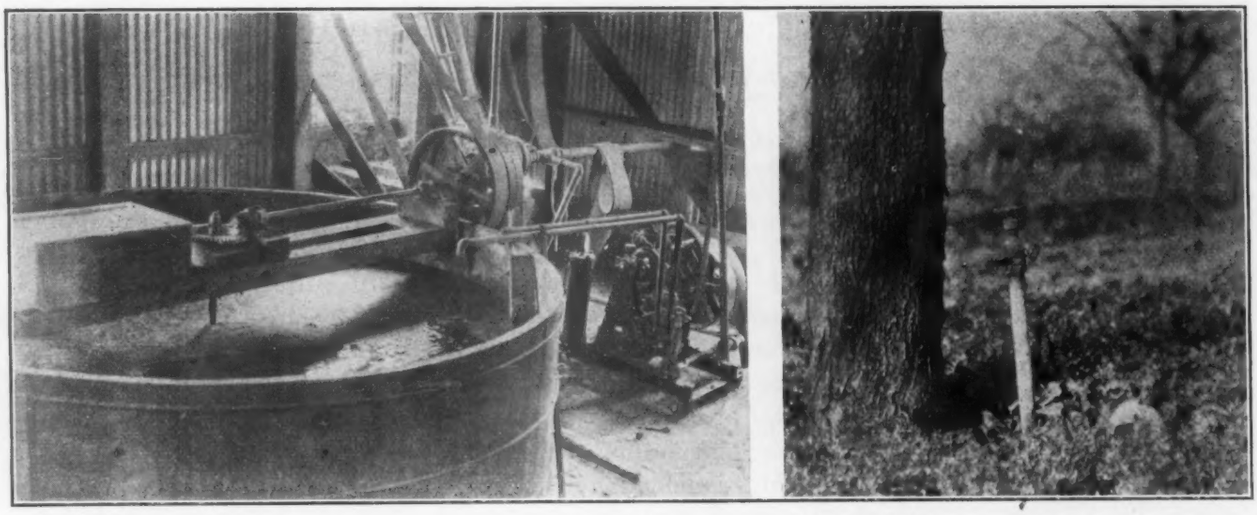
HISTORY reveals that man has been combating insects and plant diseases as far back as we have records of the cultivation of plants. Available data show that these early attempts in fighting various "plagues" (grasshoppers) and "blights" were accompanied with varied results, for in early times the control of plant enemies depended largely upon the ingenuity of the gardener or orchardist, not upon the technical knowledge he possessed. The ancients trusted in the material that had the most violent odor for results, and out of their more or less hit-or-miss practices came many experiments which through the ages have resulted in the discovery of some of the fundamentals of spraying.

The early French vineyardists were troubled with a pest which has been the source of some worry to everyone—boys—and one ingenious Frenchman resorted to the sprinkling of the vines with a mixture of copper sulphate and lime which made the fruit appear to be poisoned and frightened away the pillagers. It was noticed, however, that the vines so treated were freer from mildew than those that were not, so that this became the standard solution, known as the "Bordeaux Mixture," and it is still recognized as one of the best materials for controlling fungous diseases of plants.

Another of our present day spray mixtures was also accidentally discovered, this time through a different channel. A certain sheep man of Fresno County, California, followed the practice of dipping sheep in a solution composed of sulphur and lime to rid them of the scab. Some of this mixture was accidentally thrown on a neighboring peach tree with the result that this was the only tree that was free of San Jose scale that year. Fruit growers received



View of pumping plant, service and mixing tanks. A—Mixing tank. B—Service tank from which pump takes spray solution. C—High-pressure spray pump. D—Fresh-water pipe. (Courtesy of California State Department of Agriculture.)



A close view of the service tank with overflow pipes from the pump, and method of placing risers close to the trees to prevent damage from cultivation.

the news of the efficacy of this mixture with enthusiasm, and it became a standard spray material for combating this particular pest as well as many others.

With the development of various materials for spraying there has been a parallel improvement in the apparatus used for its application. In fact, if a spraying machine built ten years ago could be compared with today's models, the improvements would possibly be more striking than a similar comparison of automobiles. The year 1880 appears to be the dividing line between the ancient and modern methods; this year marks the discovery of the importance of lime-sulphur in controlling tree pests and diseases. The period from 1880 to 1895 was one of rapid developments. The syringe was followed by

Portable gasoline power sprayer in operation. It is frequently impossible to move this heavy rig through an orchard when the ground is wet.

the knapsack pump, the barrel pump, the geared spray pump, and finally the gas engine or power sprayer. In about 1895 the gas engine came on the job, and since that time practically all commercial spraying has been done with specially designed pressure pumps operated by gas engines. In fact it has been said that "the gasoline power sprayer distinguishes the commercial fruit grower from the amateur." That spraying is generally recognized as a beneficial practice by fruit growers is attested by the fact that there is at least one sprayer on every fruit farm of any size in the country.

There are in California, according to the 1920 census, 117,670 farms. Of these some 54,000 have orchards, and data secured from the various spray manufacturers indicate that there are approximately 10,000 portable spray rigs used by the farmers in this state, requiring the equivalent of some 30,000 hp. and consuming approximately 10,000,000 horsepower hours per year.

Up to the present time practically the entire load has been carried by the gas engine. Now it seems that we are on the threshold of a new era in spraying, marked by the use of a stationary spray plant,

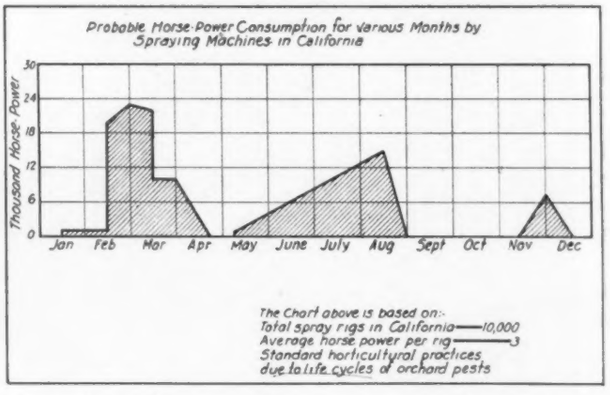


Chart showing load characteristics of portable spray rigs in California for 1924.

which offers the first opportunity for the use of the electric motor.

Pressure regulation is obtained through the bypassing of the liquid into the service tank whenever the pressure at the nozzles reaches its maximum value; this naturally takes place when the nozzles

Views showing the method of laying the pipe lines and spraying of cherry trees at a distance of half a mile from the pump. Note the high pressure attained. (Courtesy of California State Department of Agriculture.)

are closed. However, upon the opening of the valve the pressure drops and the regulator automatically closes the by-pass, permitting the pump to discharge directly into the main. It can be seen, therefore, that there will be a wide variation in load and that perfect motor control is essential.

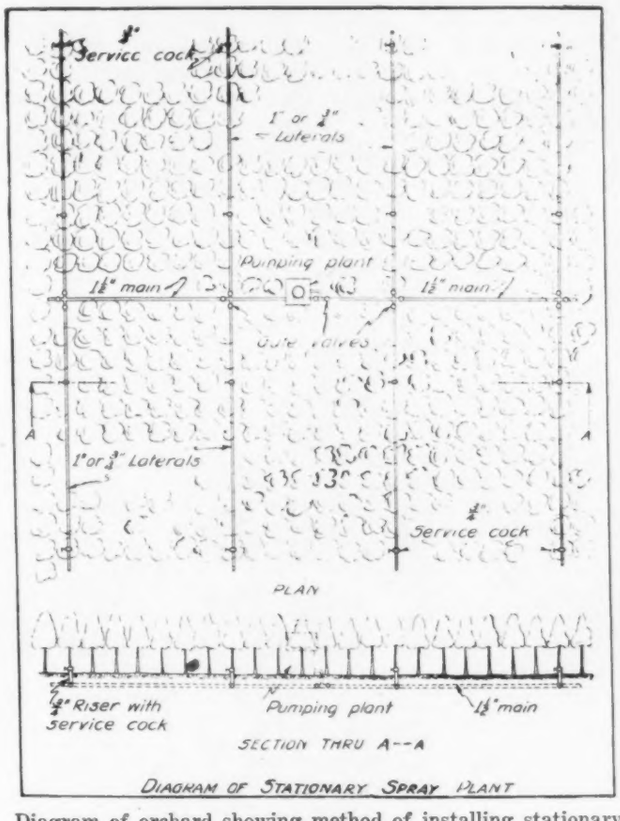


Diagram of orchard showing method of installing stationary spray plant.

The electric motor meets the requirements of uniform speed under varying load conditions, is compact, clean and efficient. The size of the motor will vary from 3 to 10-hp., depending upon the acreage served, and because of the short time it is used, only some thirty days per year, this same motor should be used for running other machinery on the farm in order to minimize the demand charge. For example, one grower uses his spray pump motor for sawing wood, cutting silage and filling silos, as an emergency for his irrigation pumps, and several other odd jobs.

Experts estimate that in the early spring when spraying is most essential at least 75 per cent of the spray rigs in California are in operation. This means then a possible load at this time of some $10{,}000 \times 3 \times .75$ or 22,500 hp. Spread throughout the year the consumption would total possibly 10,000,000 horsepower hours.

The accompanying chart on page 130 graphically shows load characteristics.

The Committee on Relation of Electricity to Agriculture, realizing the growing interest in stationary spray plants, has undertaken their study with W. P. Duruz of the Division of Pomology, College of Agriculture, University of California, as chairman. In a recent survey the committee has located several such plants in northern California that have been in satisfactory operation for about ten years, and at present another large pear grower near Sacramento is piping his orchard for the installation of a new plant. Many other fruit growers are seeing the advantages of stationary spray plants and are making plans ahead for their installation.

There exist many such problems in connection with agricultural production that are deserving of the joint effort of the farmer, the electrical engineer, and the Agricultural Experiment Station.

The Modern Home of the Los Angeles Gas & Electric Corporation

THE new office home of Los Angeles Gas & Electric Corporation, in which the utility recently has become settled, marks a forward step in the history of that organization and thus in the history of the community it serves. Located at 810 South Flower Street, in Los Angeles, the new office structure was opened for public service Jan. 19. It is a Class A, limit-height building, containing twelve floors besides mezzanine and basement, and is of steel-frame, fireproof construction throughout.

In considering this new structure, which houses at the present time over 700 employees of the main office departments, some interesting contrasts are provided in the earlier history of the utility. When the Los Angeles Gas Company, the original organization, was started in 1867, the total payroll consisted of five persons whose combined monthly salary was only $255. With this in mind it is not surprising that at that time office headquarters were not much of a problem. In 1869, however, office room was rented from Perry & Woodworth, and in 1885 there was sufficient growth to necessitate larger quarters at 9 Sonora Street, (now Republic Street), and later at 295 North Main Street. In 1889 the Los Angeles Lighting Company, another predecessor, was formed and quarters taken in the basement of the Burdick Building at the northeast corner of Second and Spring Streets. At the same time the appliance department was situated across the corner in the basement of the Bryson Building. The period from 1891 to 1903 saw the offices located at 457 South Broadway where the Metropolitan Building now stands.

Up to this time all the company offices had been in rented quarters, but in 1903 the building at 645 South Hill Street, which was vacated recently, was built and occupied. At that time that location was considered to be "out in the country." Today, however, the utility's new home is in the center of the business district at Eighth and Flower Streets.

The facade of the new structure, which is of the style of architecture popularly known as "early Italian," is of Indiana limestone with a base of native granite, with the exception of the two upper stories. Three arched doorways, with wrought-iron gates and screens, open into the main lobby. An impression of solidity, characterizing the purpose of the building, is given by the whole front design.

The chief direct contact with the public is by means of the spacious lobby which occupies nearly the whole of the first floor. In this room the walls are covered for two-thirds of their height with Roman travertine. Botticini and black and gold marbles are used in the counters. For floor materials several kinds of marble arranged in variegated designs are used. Directly off the lobby is a room of handsome appointments reserved exclusively for the use of patrons. Illumination is furnished through a number of chandeliers, each 8 ft. in diameter. Each chandelier is equipped with lamps having a capacity of 7,000 watts. To the south of the main lobby is the elevator lobby, walled its entire height in Utah Golden Travise marble.

The principal executive offices are on the ninth floor. Here are located the offices of the president, the vice-president and general manager, and the directors' room. Other officials are placed on those floors most convenient to those departments directly under their charge.

The twelfth floor of the building has been planned for employee welfare exclusively. A cafeteria, lounge and reading rooms, an assembly hall for meetings, dances and entertainments, and committee rooms have been fitted out for the comfort and convenience of all employees.

Many interesting features of modern construction are embodied in the utility's new home. Among these are an automatic inter-departmental telephone system, in addition to the usual telephones; a pneumatic carrier-tube system for the transmission of written matter; high speed elevators; an automatic elevator for transportation between departments; a freight elevator; an electric clock system; a refrigerating system which distributes cool, filtered water to all parts of the building; basement parking space for thirty-five automobiles; a flood-lighting system which illuminates the front of the structure with any desired combination of colors; and vacuum cleaning connections throughout.

The basement parking space has been found to be extremely convenient by those having company cars that are used in the city during the daytime. Traffic conditions are such that parking space on the streets adjacent to the building is seldom available, and were it not for the garage in the basement of the new building much time would be lost in parking automobiles, even when the driver wished to stop for only a short time. Regulations regarding the parking of cars in the basement garage have been passed with a view toward keeping space available in case of unexpected demands and for those men whose work is such that a readily accessible parking place is essential.

After the Los Angeles Gas & Electric Corporation had moved into its new building, an advertising campaign, planned to acquaint the public with the fact that the company was occupying new quarters, was launched in the Los Angeles papers. Advertisements showing the architect's drawing of the building were used in the various special Christmas and New Year editions of the newspapers to invite the attention of the public to the new home of the utility serving the southern California city.

THE new home of the Los Angeles Gas & Electric Corporation was designed to present an appearance of great stability. The exterior of the building, (1) adds considerably to the character of the office buildings in Los Angeles. The lobby of the building, (2) which is especially well arranged, was laid out to serve customers easily and efficiently. The office of the president of the company (3) is situated on the ninth floor.

CENTRAL STATION CONSTRUCTION OPERATION AND MAINTENANCE

Industrial Site Effects Concentration of Supplies

San Joaquin Light & Power Corporation Operates Efficient Supplies—Handling System at New Location

By D. P. MASON, Manager Supplies Division,
San Joaquin Light & Power Corporation, Fresno, Calif.

Concentration of all supplies and material has been effected through the operation of the new industrial yards of the San Joaquin Light & Power Corporation at Fresno, Calif. These yards consist of more than fifteen acres of land upon which are situated two fireproof reinforced-concrete warehouse buildings, a pole-treating plant, a crossarm mill, pole storage yards, a pipe storage yard for the water company division, and storage space for miscellaneous construction equipment. One of the warehouses is used for transformer storage, testing and handling while the other serves as a general supply warehouse. The industrial site is located just east of the city limits of Fresno along the Sanger branch of the Southern Pacific railroad at Orange Avenue, and is adjacent to the California Avenue substation.

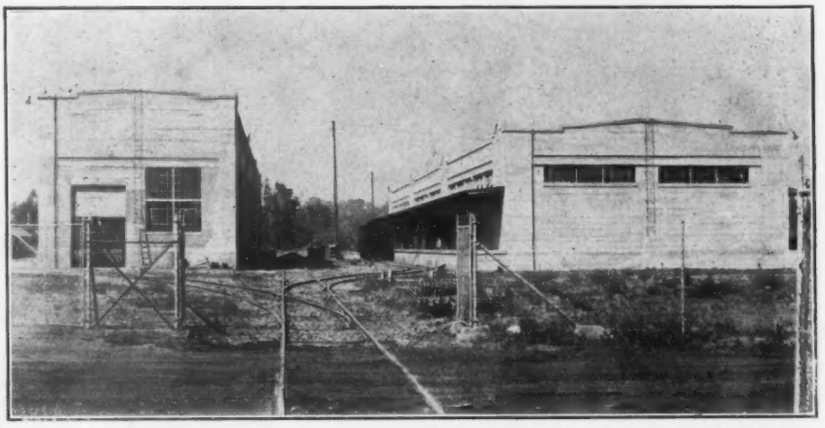
The transformer warehouse is 400 ft. long, 42 ft. wide and 37 ft. high to the top of the fire wall. Construction is entirely of reinforced concrete with the exception of the roof trusses, purlins and crane girders which are steel. The floor is laid over an earth fill which brings the level up 4 ft. above grade to standard freight platform height. This reduces the handling charges on incoming and outgoing materials. Five inches of concrete laid on the earth fill and reinforced with ⅜-in. square deformed bars provides a floor capable of carrying the heavy loads that may be imposed upon it by heavy transformers and the stacking of small transformers.

In order to hold the crane span down to economical limits the building width was selected to fit the crane rather than vice versa. Slightly over 18-ft. clearance between the floor and the crane hook provides what was determined to be an economical height to which to stack transformer crates. With this in mind and knowing the space necessary for transformer storage purposes alone as well as the space required for testing and repair facilities, it was determined that a building 400 ft. long would be necessary to fulfill the requirements adequately.

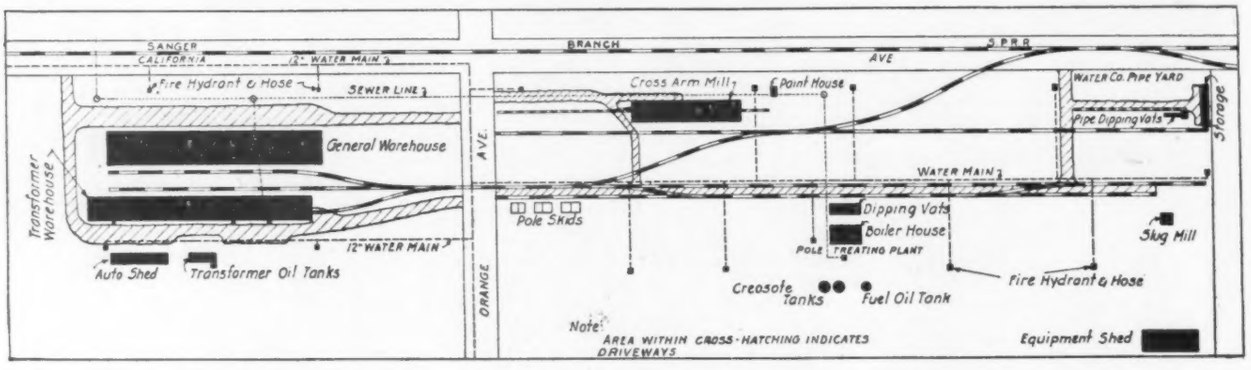
Station transformers requiring additional head room for handling are provided for at the east end of the building where the floor is constructed at grade. A spur track extending into the building at this end facilitates the unloading and handling of heavy equipment. A large pit is constructed below grade in this section of the warehouse in order that station transformers may be lowered into it to obtain sufficient clearance for pulling the windings for inspection and repair.

A three-motored traveling crane of 10-ton capacity and operated entirely from the floor serves the entire length of the transformer warehouse. The capacity of the crane is sufficient for the largest transformers that are handled at this place. Control by hand line from the floor makes it possible for one man to do the work that would require two or three with a cage-controlled crane. Moreover, the safety factor is improved, for the operator knows exactly what he wants done and does not have to depend upon signals which are easily misunderstood.

The provision made for expansion and contraction is a feature in the construction of the building that is of interest.



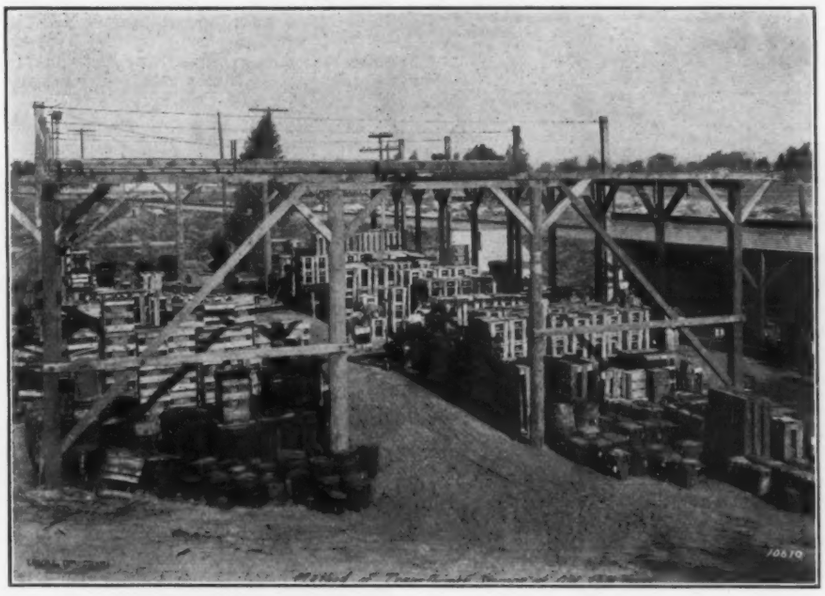
Looking west across Orange Avenue from the entrance to the pole yard. The transformer warehouse appears at the left and the general supply warehouse to the right.



Plot plan showing the general layout of the industrial yards of the San Joaquin Light & Power Corporation at Fresno, Calif. The developed site comprises some 15¼ acres.

Owing to the wide range between summer and winter temperatures in this location, an expansion of as much as 4 in. must be provided for. Otherwise the recurring stresses would wreck the building in the course of a few seasons.

Transformers and induction regulators and test tables are arranged along the wall while the high tension leads are carried overhead on swinging brackets which make it possible to reach all portions of the test floor.



The old transformer storage space at the old pole yard.

Two expansion joints divide the building into three separate units, thus localizing and reducing the motion to be cared for at any one place. The expansion joint is constructed at a column and is such that the wall may slide in a slot provided in the column. The end of the wall and the slot are metal-clad to prevent spalling of the concrete as movement takes place.

Storage tanks providing a capacity of 12,500 gal. for new transformer oil, 5,000 gal. for filtered transformer oil, 5,000 gal. for unfiltered transformer oil, 5,000 gal. for new switch oil, and 2,500 gal. for unfiltered switch oil are mounted on reinforced concrete saddles about 40 ft. from the south wall of the building. Sumps in each tank facilitate the removal of any water that might collect.

A complete system of piping, two rotary pumps and a filter press make possible full and flexible control and use of the oil. Each grade may be handled independently of the others by proper manipulation of the valves. All valves and the oil-handling machinery are located in the central section of the transformer warehouse. Gages indicating the level of oil in the various tanks and the sections of tanks where the tanks are partitioned, are arranged on the wall inside of the warehouse and adjacent to the handling equipment. To facilitate quick control of oil flow and to aid the operator in correct valving, a large multi-colored chart of the system is also mounted on the wall near the equipment. Valve numbers on the chart correspond to the numbers on the valves themselves. A pipe line extends to the railroad siding for unloading cars.

Transformer-testing equipment is set up opposite the oil-handling apparatus. Complete over-all tests are readily handled with this test apparatus.

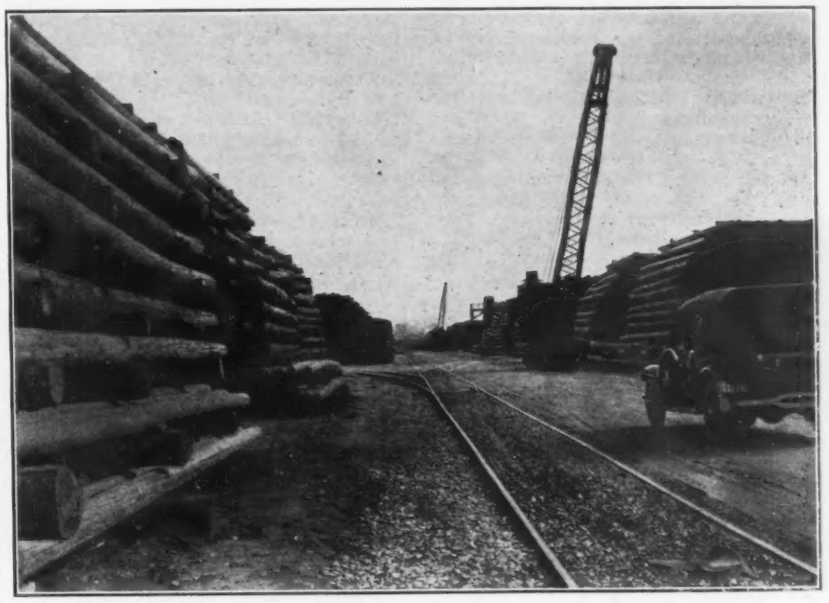
Adjacent to the transformer warehouse is the general supply warehouse. Dimensions of this building are somewhat different from those of the transformer warehouse because of the different class of service for which it was designed. The building is 60 ft. wide, 380 ft. long, 30 ft. high to the top of the fire wall and has a 40-ft. open platform at the west end. A covered loading platform 6 ft. wide runs the full length of the building on each side. Fourteen feet clear headroom between floor and lower truss chord provides economical storage space.

Architecturally the building is similar to the transformer building, with the exception of the full length platform on each side. Windows are also arranged to provide at once ample light and maximum storage space, high sidewall windows and a monitor skylight of Truscon steel sash having been adopted. These sidewall windows are glazed with 21-oz. clear glass and operated for purposes of ventilation by means of torsion-type mechanisms and hand-wheels located at a convenient height from the floor. A floor 4 ft. above grade, and expansion joints in the walls the same as in the transformer building, are also provided. The 40-ft. open platform at the west end of the building is complete as to foundation and arranged to receive the walls and columns of a future addition when it is needed.

The general supply warehouse is fitted out not only for general storage purposes, but also houses the salvage department and the printing department. Steel shelving and bins are provided throughout and are found to afford a maximum of storage space and to give a neat appearance. A motor-operated stacker effects economical use of floor space and is more adaptable to this general usage than a crane. The machine is capable of lifting a ton.

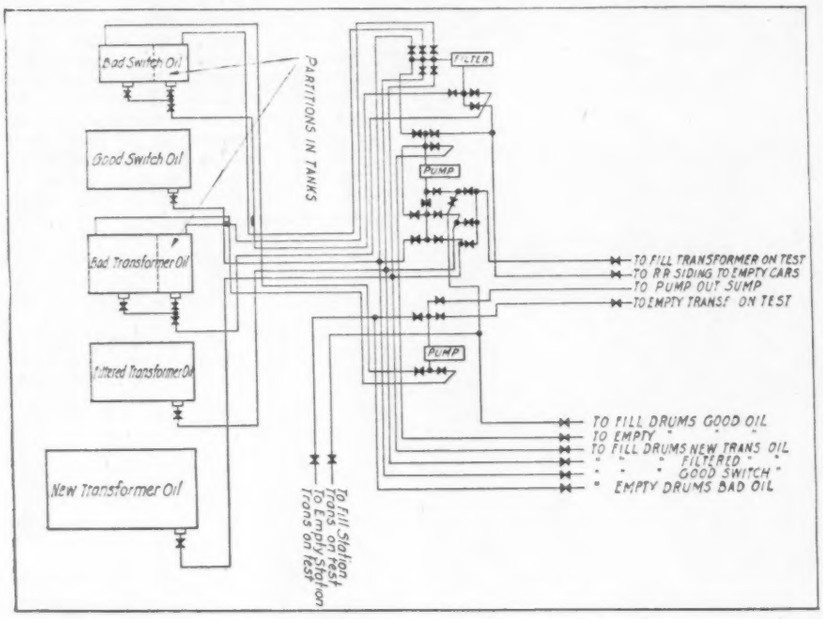
Suitable office and lavatory arrangements are provided in both buildings. Each warehouse is served by a standard-gage spur track running the full length of the building, making possible the handling of several cars at each warehouse at the same time without interference.

Facilities for storing about 25,000 poles are provided at the company's pole yard located just east of the warehouse yards across Orange Avenue. The two are connected by a standard-gage spur track and two driveways. Three standard-gage tracks extending the full 1,300-ft. length of the pole yard afford ready transportation access to all parts



Showing the two locomotive cranes, both of which in this case happen to be operating on the south track. Part of treating-plant superstructure is seen in background between the two cranes.

of the yard. Two of these tracks are laid one on each side of a main central driveway and far enough apart that the two 10-ton stiff-legged steam-operated locomotive cranes can operate at the same time without interference and also permit trucks to run the full length of the central driveway without interfering with either crane. Curves and switch frogs used in all spur tracks permit the operation of a road engine over all parts of the tracks. However, most of the car-shunting is done by the steam cranes. Low yard-type switch stands are installed throughout the yards to prevent their being struck when handling poles. In the yards there is a total trackage of 6,650 ft. 375 ft. of which the San Joaquin Light & Power Corporation built. The Southern Pacific railroad laid the remaining 6,250 ft. under contract.


Bad Switch Oil
Good Switch Oil
Bad Transformer Oil
Filtered Transformer Oil
New Transformer Oil
PARTITIONS IN TANKS
FILTER
PUMP
PUMP
TO FILL TRANSFORMER ON TEST
TO R.R. SIDING TO EMPTY CARS
TO PUMP OUT SUMP
TO EMPTY TRANSF. ON TEST
TO FILL DRUMS GOOD OIL
TO EMPTY " " "
TO FILL DRUMS NEW TRANS. OIL
" " " FILTERED " "
" " " GOOD SWITCH "
" EMPTY DRUMS BAD OIL
To fill Station Trans on Test
To Empty Station Trans on Test

Schematic diagram of piping system used for handling transformers and switch oil. Provisions are such that new oil, bad oil, and filtered oil are each handled entirely separately to avoid adulteration. In filtering bad oil a portion is isolated in the partitioned tanks and circulated through the filter until it is of a quality sufficiently high to permit its being either pumped into storage or into use as the case may be.

Modern methods and equipment are incorporated in the new pole-treating plant, which is an important unit of the industrial site. Located in the center of the yard, the plant is so arranged that the treating tanks are served equally well by either crane on either of the central tracks or may be served by both at once. The plant has capacity for treating two carloads of poles per day. Methods of treatment are the same as those adopted by other modern plants for the butt-treatment of poles with an approved grade of creosote.

Skids are installed along the driveway near the entrance to the pole yard, and on these skids there is kept a stock of treated 35- and 40-ft. poles. These lengths are those most frequently called for. The beds of the skids are constructed at such height that it is possible to roll poles from the skids to the waiting trucks, thus making unnecessary the use of the crane for routine loading of poles. This feature saves not only the time of the crane and its operator but also the time of the line crew, which can in this way help itself to what it needs with no delay.

Crossarms are manufactured at a mill installed for the purpose near the northwest corner of the yard where it is handy to the driveway which serves the skids and conveniently situated with regard to the other facilities of the yard. The mill is housed under a building 40 ft. by 200 ft., of wooden construction, open sides and corrugated iron roof. One end of this building is utilized to store part of the lumber used for crossarms, and the other end houses two cross-cut saws and a boring mill. The boring mill is a gang-operated set of bits so arranged that all of the holes needed in an arm may be drilled at one time and with one operation. A roll conveyor and a 36-in. gage industrial railroad serve the mill and lumber storage yard to better advantage than the continuous conveyor originally planned, because the intermittent operation needed in conveyor connection between mill and yard would not warrant the first cost and upkeep of a continuous conveyor.

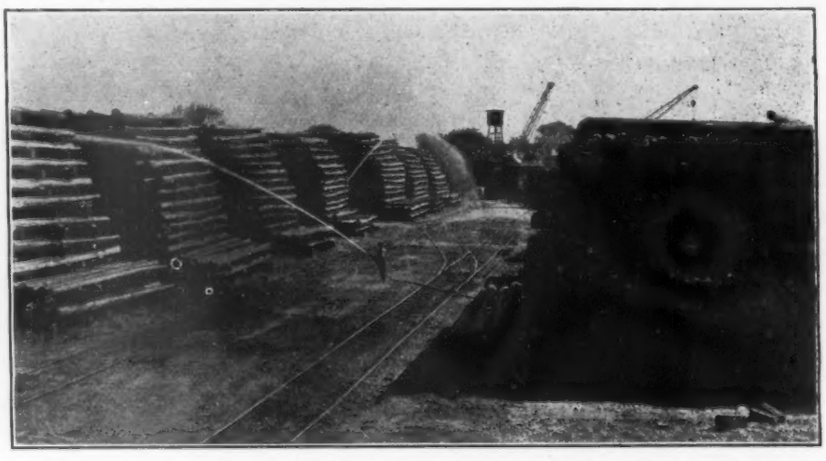
Pipe handling and storage facilities are provided at the northeastern corner of the pole yard. A dipping vat 23 ft. long for treating the pipe and a 36-in. gage industrial railroad for distributing to storage piles after treatment are the main features of this division.

Miscellaneous bulky equipment such as cement mixers, trucks, and tractors, are stored under a 200-ft. open shed located where it does not interfere with pole storage.

Bituminous macadam paving to the extent of 80,000 sq. ft. is laid in the yards and designed to give access to every part of the yard and to every building and at the same time to occupy the least possible space. The central driveway in the pole yard is laid between the two tracks, which are necessary for the operation of the two cranes, and thus utilize space that would otherwise be useless. Construction of these roadways was handled by the corporation. However, due to not having adequate road-building facilities, there was no saving effected through this effort, and the results were not entirely satisfactory.

Fire protection has been given prominence in the design and layout of the pole yard. Ten hydrants are located at convenient intervals throughout the yard. Each hydrant is fed by a 6-in. lateral from a 12-in. main, which is laid down the central driveway. These laterals are all less than 170 ft. long. Each hydrant is covered by a small wooden house 4 ft. by 4 ft. in size. One hundred and fifty feet of hose is stored on a shelf in each one of these houses and is hooked up to the hydrant ready for use without a moment's delay. The arrangement is such that even the most remote parts of the pole-storage space may be reached by at least two lines of hose without any delay and with equipment just as it is. Three lines can be brought into play at most points.

Two Foamite chemical engines are kept at the boiler house in the center of the yard for use in quenching oil or creosote fires. Hand extinguishers distributed throughout all of the buildings



Fire protection becomes an item of extreme importance where 25,000 poles are kept in stock. Especially is this true when most of them are creosote-treated. Two streams are shown in action above, and there are eight more available. This is a top view of the treating-plant structure.

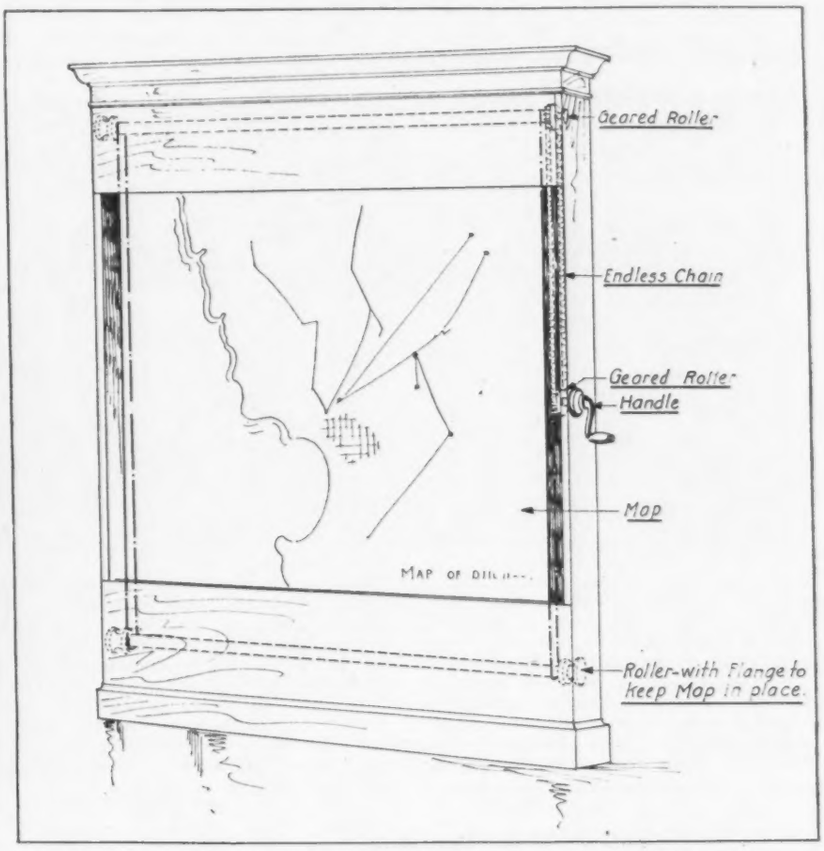
on the site serve as auxiliary equipment. A Foamite engine kept in the transformer warehouse near the oil-handling equipment reduces the fire hazard incident to the storage and handling of transil oil. Four hydrants are located where they would be most effective for the warehouse premises. All fire lines are supplied directly from the mains of the Fresno City Water Corporation.

Considerable study was given to the general arrangement of the driveways, trackage and buildings with a view to providing the most convenient transportation and at the same time cut up the grounds as little as possible. Plants and equipment of other companies up and down the Coast were studied, and the best features of each used where adaptable to the needs of this company. The layout adopted permits access to every part of the yards by road and by rail in an efficient manner.

Motor-operated portable stacker used in the general supply warehouse. Service outlets are located throughout the building at convenient locations. This, together with the flexible cable carried on the machine, makes possible the operation of the stacker in any part of the building. The machine has a lifting capacity of 2,000 lb. and is more convenient and economical for this general service than a crane.

Trucks coming in for line material drive to the general warehouse, entering at the northern gate on Orange Avenue. After loading what is needed from there, they proceed to the transformer warehouse where transformers are secured, if necessary, and from there out the southern gate on Orange Avenue and directly across the street into the pole yard. The pole skids are located just inside of the gate at this point, and after picking up the required poles the truck is piloted out past the crossarm mill where the final bit of material is loaded. Leaving the mill, the truck is already headed for the northern gate leading from the pole yard into Orange Avenue. This continuous-circuit effect in loading line trucks saves time and effort and avoids all back-tracking.

The industrial yards have been in operation for about a year, and the supplies division has not had one complaint from construction or operating crews regarding service conditions. Further, the assembling of all materials at one location has made possible a material reduction in the cost of handling and distributing supplies. During 1924 about $1,650,000 worth of material was handled through the yards. Poles to the value of $250,000 were issued during the year. Transformers, wire, and general construction supplies made up the balance of the above figure.

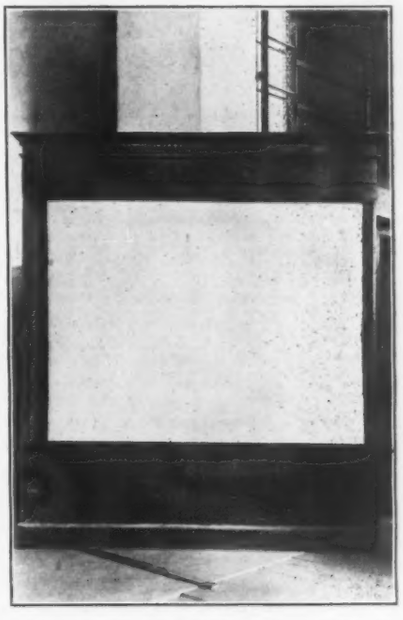


Schematic diagram of the roller system used in the system map cabinet described in the accompanying article.

Continuous Roller Map Mounting Handy for Substation

A handy means of mounting a map of the system of the Great Western Power Company is in use at the Brighton substation of that company. In this case the several map sections necessary to cover all of the major portion of the company's transmission have been mounted upon a strip of heavy cloth and properly matched up to form a continuous map. This strip is endless and runs on two rollers mounted in a cabinet as shown in the accompanying illustrations. The operating mechanism consists merely of a small sprocket wheel attached to one end of the upper roller and a similar sprocket mounted lower down on the side of the cabinet where it is within convenient reach of the operator. A small chain connects the two sprockets.

The cabinet is about seven feet high and six feet wide, and provides an inexpensive and handy medium of support for transmission maps. Any desired portion of the map may be rolled into view with but a moment's effort. Due to the continuous cloth mounting, it is not necessary to roll the map in any one particular direction.



Roller-map cabinet devised to accommodate the system map for the convenience of the operators at the Brighton substation of the Great Western Power Company.

IDEAS FOR THE CONTRACTOR

Wiring Residences for Electric Service

By G. Walter Spencer

Proprietor, Spencer Electric Company, Oakland, Calif.

The 1924 building program of the United States is estimated at about six billion dollars. Of this estimate—

4.1 per cent is for public buildings
6.7 per cent is for churches
7.6 per cent is for hospitals
10.2 per cent is for offices
12.7 per cent is for industrial plants
19.7 per cent is for schools
38.9 per cent or approximately $2,332,000,000 is for residences

Recently an effort has been made by the electrical industry to have the wiring of residences total 3 per cent of the total cost of the building. Assuming, for the sake of argument, that this 3 per cent figure has not yet been reached but that a 2 per cent figure might be taken as a fair average, this building program of $6,000,000,000 should show a total wiring expenditure of $46,640,000. It seems fair to use this 2 per cent figure on account of the fact that the ratio of wiring expense to total building costs has been constantly increasing due to the fact that better wiring jobs have been done and that residences have been more completely wired for electric service. For example, a residence wiring job in a modest house that four years ago at the highest wiring prices would have cost about $75, today is bringing more than $75 due to additional brackets, outlets, convenience outlets, wiring for electric ranges, electric heaters, etc. It should be borne in mind that this is true despite the price reductions in the cost of materials that have taken place within that period. The value to the consumer, that is to say, to the owner or tenant of the premises, of adequate facilities for complete electrification of the home has been proved so often that the electrical contractor who makes a specialty of taking jobs purely on a low price basis is no longer in favor. At too great a cost, the home owner has learned that cheapness seldom brings satisfaction. The cost of this lesson has been borne, too, by the contractor-dealers, who have learned, greatly to their sorrow, that low price wiring jobs not only did not show them a profit on the work they had so taken but that these jobs kept the contractor-dealer from making the legitimate profit to which he was entitled on an adequate installation. This type of contractor-dealer has, too, fallen into disrepute in trade circles, has generally fallen behind in the payment of his bills, and has altogether become an undesirable member of the electrical fraternity. He has also lost caste in the eyes of the home owner and has generally gained a reputation of being an undesirbale person with whom to do business.

In striking contrast with this type of contractor-dealer is the man who has studied his business, has given heed to the growing demand for electrical service in the home, who has kept pace with that demand and instead of trying to cheapen each job, has, instead, tried to sell the home owner the most completely electrified home possible, knowing that, while to do this would undoubtedly result in a much higher bid than that of some cheap competitor, the ultimate satisfaction to the owner of the property would be sufficiently great to justify any effort the contractor might put forth toward raising the standard of installation. The really alert contractor-dealer has not alone been satisfied with maintaining code standard of installation such as exclusively conduit wiring, enclosed entrance switches, etc., but he has gone further and has induced the home owner to install lighting and convenience outlets in places where they were not originally specified. He has done this in order that the owner might have the

ESTIMATE

Date ..... 192 .

Spencer Electric Company

"Efficient Electrical Service"

220 13th STREET, OAKLAND

Oakland 492 Oakland 2288

To ..... Address .....

For the sum of ..... dollars we will install electrical wiring as listed below, in building located .....

Owner ..... Address .....

Terms are three-fourths payment due on completion of roughing-in and balance 10 days after job is completed. Payments for all extra labor and material shall be made at the time such extra labor and material are furnished. This estimate is governed by the terms and conditions herein contained and printed on the back hereof.

Spencer Electric Co.

Accepted ..... 192 ..... By .....

	Ceiling Outlets	Bracket Outlets	S. P. Switches	3-Way Switches	Conv. Outlets	Push Buttons	Special Outlets	Heater					
Front Porch													
Reception Hall													
Living Room													
Dining Room													
Kitchen													
Breakfast Room													
Service Porch													
Pass Hall													
Bath No. 1													
Bed Room No. 1													
Closet													
Bed Room No. 2													
Closet													
Upper Hall													
Bed Room No. 3													
Bed Room No. 4													
Bath No. 2													
Sleeping Porch													
Basement													
Rear Porch													
Garages													
Total Outls.													

Good home lighting is the essential part of living

Electric Lighting Fixtures

We will gladly help you plan and offer our expert services.

Front side of estimate sheet used by Spencer Electric Company, Oakland, Calif. Note that detailed specifications of all outlets for each room are clearly shown and that the total is also given as a check.

All work to be done in a good and workmanlike manner, and in accordance with the ordinances, if any there be, of the city in which it is to be performed, and with the laws of the State of California, and when not covered by such ordinances and laws, the rules of the National Board of Fire Underwriters shall apply.

Should there arise any condition to necessarily hinder carrying on the work as specified and ordered, and over which the SPENCER ELECTRIC COMPANY has no control, the SPENCER ELECTRIC COMPANY is at once entitled to and must be paid on demand an amount not less than eighty (80%) per cent of the estimated cost of work that has been performed and material furnished, and that the balance of the estimated cost of work performed and material furnished must be paid within sixty (60) days from date of notice by the SPENCER ELECTRIC COMPANY of their inability to further proceed with the work.

In the event of the failure to pay any installment or installments on the contract price herein provided for, when due, then the SPENCER ELECTRIC COMPANY at their option, which option shall continue during all the time of such default, may remove from the premises any materials or fixtures that shall or may have been installed therein by them or delivered by them to the premises, and may apply the value of such materials or fixtures so removed on account of any indebtedness due them on the contract. The option herein provided for shall be in addition to any and all other remedies the SPENCER ELECTRIC COMPANY may have to enforce their contract, either in law or equity.

The SPENCER ELECTRIC COMPANY is not familiar with the condition of the legal title to the property covered by this agreement, and if at the time of the execution of this agreement or at any time prior to the actual commencement of work by the SPENCER ELECTRIC COMPANY under this contract it should appear that there is a trust deed, mortgage or judgment lien upon said property, or said property is subject to a first mortgage or first deed of trust, then and in that event the SPENCER ELECTRIC COMPANY may, at their option, refuse to further proceed with the work, and the SPENCER ELECTRIC COMPANY shall in no way be liable for any damages whatsoever by reason of such refusal. In the event the SPENCER ELECTRIC COMPANY shall abandon the work for either of the reasons above stated, or in the event of loss by fire, the price mentioned herein for the completed work shall be disregarded and payment in full for all work done to that time shall be immediately due and payable, the value of such uncompleted work to be determined on the basis of the cost of labor and material as specified in Pacific Coast Electrical Data and Sales Book.

If suit be commenced or other legal proceedings be taken to enforce the payment of any amount due under this contract, a sum equal to twenty-five (25%) per cent of the amount of this contract shall be added to such amount for attorney's fees.

Payment for roughing-in work or allowing later work to proceed shall constitute an acceptance of the roughing-in work as satisfactory and no claim shall be made against the SPENCER ELECTRIC COMPANY for damages or errors after the work has been passed by the City Inspector. "Roughing-in" work includes only work necessary to pass "roughing-in" inspection under the ordinance, laws or rules governing the work. The SPENCER ELECTRIC COMPANY shall not be responsible for damage to fixtures after they are installed. The SPENCER ELECTRIC COMPANY shall not be held liable for any loss, damage or delays occasioned by fires, strikes or other causes beyond their control.

Any change in the location of an outlet from that shown on plans, or as originally agreed upon, shall constitute an extra outlet, payment for which shall be made as specified in Pacific Coast Electrical Data and Sales Book.

All appliances, equipment, fixtures, switches, and other material or property of any kind or character whatsoever, which may be removed from the structure upon which they have been placed by the SPENCER ELECTRIC COMPANY under this agreement, without the destruction of any wall, floor or foundation, shall not be considered as affixed to the said premises, and shall remain the property of the SPENCER ELECTRIC COMPANY until full payment for same shall have been made. All payments made under this agreement shall be applied first to the payment for labor, and secondly to the payment for material affixed to said premises, and the remainder to the payment for fixtures, appliances, equipment, switches, and other property furnished or owned by the SPENCER ELECTRIC COMPANY.

Reverse side of form used by Spencer Electric Company, Oakland, Calif.

most truly convenient use of electricity at any spot in the home where electrical application might be desired. He has also made provision for the future use of additional electrical equipment. For example, in those cases where the owner of the property was not yet ready to use electricity for cooking or heating, the conscientious contractor-dealer has induced the owner at least to put in conduits to the various rooms at the time of construction so that in the future when it might be desired to apply electricity on a larger scale to the domestic life of the occupants, the expense of installation would be very materially lessened.

A contractor-dealer who is really interested in putting the best possible job in a residence will, instead of taking the meager plans and specifications usually furnished, get in touch with the owner of the property and go over the plans room by room explaining in detail just where outlets, floor plugs, switches, bells and other calls and all electrical features should be located. He will also explain the purpose of each of these various devices in order that the property owner may make an intelligent decision. Owing to the fact that architects are generally not fully informed as to the proper application of electricity in the home, it is almost always possible to put in one or more extra outlets in the laundry, kitchen, dining room, living room and so on. These additional outlets should be carefully plotted out on the plans and the reason for recommending them should be carefully explained.

Not the least important part of a contractor-dealer's work is to have an adequate and complete estimate sheet. This is necessary in order that nothing be left off and also that no necessary computations be omitted in figuring the cost and selling price of the job. For a contractor's own protection he should use a contract bid form of estimate. This form is in effect a lease-contract and contains very clearly established terms of payment as well as a complete outline of the material and labor to be furnished, together with the net selling price of the job. The contract bid form is signed by the contractor and is also signed by the one accepting the bid, and provision is made in the terms of the contract for the protection of the contractor as to appliances, equipment and other material which may be removed, if necessary, without destruction of the wall, floor or foundation. This is an extremely important provision of the contract and constitutes a big item of protection on those jobs which become financially involved. I have in mind the case of a contractor-dealer who had over $900 worth of equipment on a job when the general contractor got into financial trouble. The net result was that at the bankrupt sale, which was held some time later, it was necessary for the electrical contractor to appear and buy back his own material at a cost of approximately $200. It hardly seems necessary to enumerate the various expenses which he had to absorb on this job such as overhead, interest, labor, lack of profit and so on, all of which would have been eliminated had the job been done under a contract bid. Figures 1 and 2 show the form used by the Spencer Electric Company in rendering estimates. This form has been found very satisfactory in practice over a period of several years.

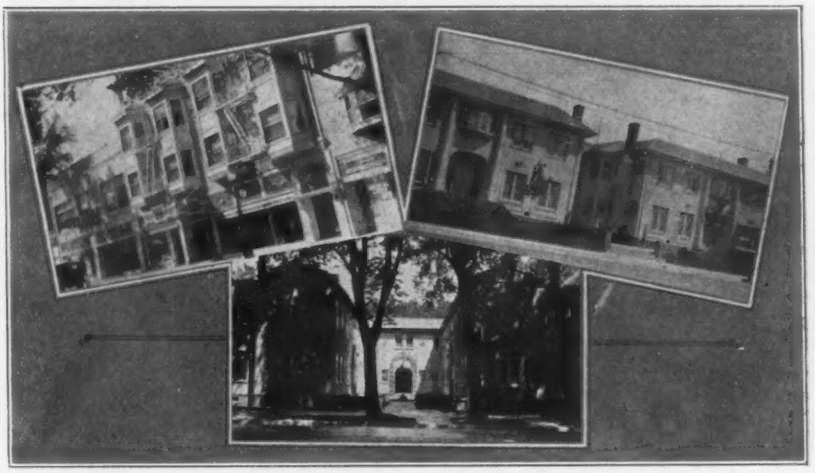
Many Electric Apartment Houses in Sacramento, Calif.

Electrical contractor-dealers have a splendid opportunity for increasing the volume and improving the character of their work by selling the idea of complete apartment house electrification. There are now so many all-electric apartment houses that owners and builders are generally found to be in a very receptive mood. The return to the contractor justifies the effort expended and a satisfactorily equipped electrical apartment house paves the way for future wiring business of similar nature. ture.

That apartment house owners of Sacramento, Calif., realize the value of electrical equipment is well proved by the accompanying pictures of electrical apartments in that city. The Florence Delahunty apartments, at Forty-second and J Streets, contain four 4-room and four 5-room apartments. These are completely electrical, each being equipped with a Hotpoint-Hughes Super-Automatic electric range, three 3½-kw. Wesix flush type electric air heaters and one 2½-kw. Wesix portable air heater. A 7½-kw. Wesix water heater connected with a 200-gallon storage tank provides a central water heating plant for all of the apartments.

The Edith Grove apartments at 1617 I Street contain twelve 2- and 3-room apartments. Each is provided with a Standard electric range, and each room is equipped with a 1,000-w. convenience outlet for portable air heaters.

The Lauppe apartments at 1321 K Street were recently completed. They are located in the rear of the store and apartment building erected by Frank Lauppe several years ago. There are twenty-two 2-room apartments, and each is equipped with a Standard electric range.



Some of the apartment houses of Sacramento, Calif., that have recently been fully electrified. Wiring for electric ranges, water heaters and air heaters has been installed.

Denver Contractors Issued Licenses.—Contractors' licenses have been issued in Denver recently to W. H. Fick, operating as the Castle Electric Company, and to C. W. Macy, 1462 South York Street. Walter Coburn, who has been operating a contracting business from his own home for several years, will shortly open a retail store at 50 Broadway.

Advantages of Membership in the California Electragists

By Walter F. Price,

Executive Secretary, California Electragists.

It is repeatedly asked by electrical contractors and dealers, "What can I get out of membership in the California Electragists, and what are the benefits that I am not already receiving?" A trade association is based on this fundamental principle: No one man in business can accomplish as much alone as a group of men in the same business can accomplish through united effort. It is rapidly becoming recognized among business men that unless a man is affiliated with his trade associations in a substantial way there must be something wrong with his business policies, he is an obstructionist in his line, or he is considered too unreliable by his competitors to be accepted as a member of the association. There is also the type who is always looking for a "free ride," continually expecting to cash in on the other fellow's development efforts. No man in business can afford to be avoided by his community for lack of membership in his trade associations. "Every man owes some of his time to the upbuilding of the profession to which he belongs."

The Association of Electragists, International, is organized for the protection and upbuilding of the contractor-dealer branch of the electrical industry. A member may expect out of the association proportionately what he puts in. A hasty glance over the list of active association members will soon convince that they are the most successful contractors and dealers in the business. Membership in the California Electragists, which is affiliated with the international association, includes membership in the Association of Electragists without further cost and with it all of the rights and privileges to the use of the registered trademark, "Electragist," which is rapidly becoming a national emblem of responsibility for the contractor and dealer, technical data, cost records and business helps prepared by experts for members of the association.

The word "Electragist" was designed

for the Association of Electragists, International, from the Greek words meaning "He who leads electrically," and is defined as "an active leader in the business of high-grade electrical contracting and retailing, who is a member of the Association of Electragists, International." This trademark is zealously protected by the association for the benefit of its members. In districts where it has been in use the public seeks an Electragist because of his responsibility as an active leader in the community and his reputation for dependable service.

It is only through the state and national association that things can be accomplished in a big way, such as dealings with other branches of the industry and representation on the committee that drafts the National Electrical Code. Without such an organization to take up recommendations on code matters, the electrical contractors would be helpless and would have to content themselves with just what is handed to them in the Code. The so-called 15-ampere unlimited branch circuit in the 1923 Code is a good example of what they have to accept against their wishes. An active Code Committee, under the chairmanship of A. Penn Denton of Kansas City, is now at work on Code matters, and with representation on the executive committee of the Association of Electragists and the local code committee Electragists have a voice in the matter and look forward to further benefits.

The jobbers are well organized, the manufacturers, and the power companies. Why then should the contractor-dealer be the weak link in the business and continue to take dictation from the rest of the industry? "In unity there is strength."

English Contractors' Association Protects Its Membership

Electrical contractors' trade associations are growing in number and strength in nearly every section where the contracting business exists. There are numerous strong contracting organizations in the United States, and England now has an organization of this nature. The conditions for admission to this organization, the National Register of Electrical Installation Contractors, are considerably more rigid than is common in this country. The following, taken from a letter from the secretary of the National Register of Installation Contractors indicates most clearly that membership in this organization is not a thing easily obtained. A contractor must measure up to a very clearly defined standard before he can gain admittance to the ranks of the association.

"Briefly, this Association has been formed for the purpose of supporting bona fide installation contractors and the suppression of the bogus ones, and we have a certain standard of qualification which every applicant for registration must possess. These applications are thoroughly sifted both by the Executive in this office, and a Local Advisory Committee composed of a representative of the Supply Industry, the Institution of Electrical Engineers, and of the Electrical Contractors' Association respectively, functioning in the District from which the application is made. If the report of this Local Advisory Committee is satisfactory, the application is again considered by a Scrutinising Committee in this office, who, if satisfied, recommend the application to the Executive for acceptance, and acceptance generally follows. If the Local Advisory Committee do not recommend the application, they are requested to state fully why, and this report comes before the Scrutinising Committee who being satisfied put in a recommendation to the Executive that it should not be accepted, and it generally follows that this happens, but the point that I am making here, is, that every effort is made by the Executive to protect a legitimate contractor, and that three sets of officials have to be satisfied one way or another as to whether the applicant shall be, or shall not be accepted."

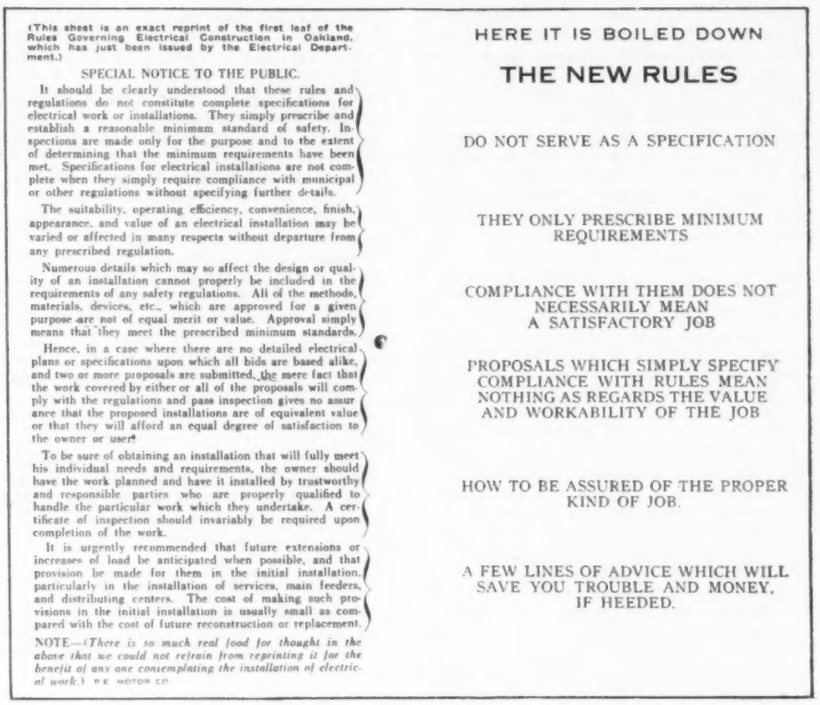
Motor Company Aids Improvement In Wiring Conditions

Electrical contractors are striving through their associations and individually to improve general trade conditions. As a contribution to this movement the Pacific Electric Motor Company, Oakland, Calif., has recently issued a four-page circular for distribution to builders, home owners, industrials and others who may require electric wiring service. The first and second pages of this circular are reprints from the recently enacted provisions of the Oakland electrical ordinances, which became effective on Jan. 1, 1925. The other two pages contain comments stressing the need for employing qualified firms for electric work and the necessity for complying with the ordinance together with this statement, "Published by the Pacific Electric Motor Company as a contribution to the movement for better electrical work."

Post Office Department Rules on Apartment Letter Boxes

It has for some time been customary, at least in the West, for the electrical contractor to install the door call or door telephone and mail box system. The increase in the number of apartment houses has resulted in an increased number of manufacturers of apartment house letter boxes, and there have been produced many widely varying types and styles. Some of these types have been well adapted to the purpose of the Post Office Department, while others have occasioned the carriers considerable delay and inconvenience.

This latter fact, together with the fact that receptacles provided for the receipt and delivery of mail and the mail deposited therein have the protection of the law against injury, destruction and theft, caused the Post Office Department to issue uniform regulations for the installation of apartment house letter boxes. These regulations, of course, are effective where apartment house or hotel management has not arranged that mail be delivered at the office or desk for distribution by its employees, and the regulations apply to apartment houses, family hotels and flats containing three or more apartments. In order No. 9596 from the office of the Postmaster General, it is decreed that such mail receptacles shall be arranged in groups of such number as may be practicable, each group to be equipped with a master door, on the opening of which the entire group of receptacles is accessible for the deposit of mail by the carrier. The master door shall be secured by a lock furnished by the Post Office Department for use as long as mail is delivered by letter carrier and the key of the lock shall be in the



(This sheet is an exact reprint of the first leaf of the Rules Governing Electrical Construction in Oakland, which has just been issued by the Electrical Department.)

SPECIAL NOTICE TO THE PUBLIC.

It should be clearly understood that these rules and regulations do not constitute complete specifications for electrical work or installations. They simply prescribe and establish a reasonable minimum standard of safety. Inspections are made only for the purpose and to the extent of determining that the minimum requirements have been met. Specifications for electrical installations are not complete when they simply require compliance with municipal or other regulations without specifying further details.

The suitability, operating efficiency, convenience, finish, appearance, and value of an electrical installation may be varied or affected in many respects without departure from any prescribed regulation.

Numerous details which may so affect the design or quality of an installation cannot properly be included in the requirements of any safety regulations. All of the methods, materials, devices, etc., which are approved for a given purpose are not of equal merit or value. Approval simply means that they meet the prescribed minimum standards.

Hence, in a case where there are no detailed electrical plans or specifications upon which all bids are based alike, and two or more proposals are submitted, the mere fact that the work covered by either or all of the proposals will comply with the regulations and pass inspection gives no assurance that the proposed installations are of equivalent value or that they will afford an equal degree of satisfaction to the owner or user.

To be sure of obtaining an installation that will fully meet his individual needs and requirements, the owner should have the work planned and have it installed by trustworthy and responsible parties who are properly qualified to handle the particular work which they undertake. A certificate of inspection should invariably be required upon completion of the work.

It is urgently recommended that future extensions or increases of load be anticipated when possible, and that provision be made for them in the initial installation, particularly in the installation of services, main feeders, and distributing centers. The cost of making such provisions in the initial installation is usually small as compared with the cost of future reconstruction or replacement.

NOTE—*(There is so much real food for thought in the above that we could not refrain from reprinting it for the benefit of any one contemplating the installation of electrical work.)* P.E. MOTOR CO.

HERE IT IS BOILED DOWN

THE NEW RULES

DO NOT SERVE AS A SPECIFICATION

THEY ONLY PRESCRIBE MINIMUM REQUIREMENTS

COMPLIANCE WITH THEM DOES NOT NECESSARILY MEAN A SATISFACTORY JOB

PROPOSALS WHICH SIMPLY SPECIFY COMPLIANCE WITH RULES MEAN NOTHING AS REGARDS THE VALUE AND WORKABILITY OF THE JOB

HOW TO BE ASSURED OF THE PROPER KIND OF JOB.

A FEW LINES OF ADVICE WHICH WILL SAVE YOU TROUBLE AND MONEY, IF HEEDED.

Inside pages of circular issued by Pacific Electric Motor Company, Oakland, Calif., and designed to stress the need for better electrical work. The left page is a reprint from the Rules Governing Electrical Construction in Oakland, and the right page sums up the meaning of the rules. This circular has been distributed in large numbers to those who may have occasion to require electrical work.

custody of postal employees. The doors to the individual letter boxes shall be secured by satisfactory locks, with a sufficient number of key changes to prevent the opening of other letter boxes by the use of the key of any letter box. Each receptacle shall be identified by a number and shall have affixed to the interior where it can easily be read by the carrier when the master door is open, a list of the names of the persons receiving mail through such receptacles. All receptacles must be of sufficient capacity to receive long letter mail, as well as certain magazines which are approximately 18 in. in length. The minimum permissible length of mail to be received is 12 in.

It is specified that groups or batteries of mail receptacles should be as large as consistent with space available for construction, but in no case shall there be less than 6 such receptacles in each group, except where the number of apartments is less than 6. Receptacles are required to be placed so that they will be adequately lighted and the owners or managers of apartment houses are required to keep these receptacles in good repair. It is permissible to combine telephone units with mail receptacle units, provided that access to the telephone unit is not dependent upon entering the mail receptacle, and the mail receptacle must not be accessible when the telephone unit is open. The master lock shall not be more than 5½ ft. from the floor. Where it is necessary, in installing apartment house mail receptacles in conjunction with the installation of the telephone unit of standard size, to place the receptacles in two tiers, they may be placed in groups or batteries of less than 6, if required for the proper group arrangement. This, however, applies only where it is desirable to install a telephone unit in connection with the mail receptacles, and does not apply to cases where the telephone unit is installed independently of mail receptacles. These instructions became fully effective Sept. 1, 1924, and govern all apartment houses, family hotels and flats constructed after that time, or substantially remodeled to the extent that a material change in the location of the mail receptacles is involved.

A list of approved receptacles may be obtained on application to the Post Office Department.

Model Electric Home Exhibited in Petaluma, Calif.

"All the comforts of home" becomes something more than a mere saying when the home is electrically equipped. This was effectively demonstrated in Petaluma, Calif., recently when the Cornick Electric Company, electrical contractors of that city, exhibited an eight-room electric home.

Equipment in the kitchen consisted of an electric dishwasher, automatic range, water heater, percolator, table stove, iron, beater, and blower ventilator with reversible fan motor. In the laundry were a washing machine and ironer. A grill, toaster, percolator urn set, waffle iron, fan and wall type heater were among the appliances in the dining room, while the living room was equipped with radiola, floor lamp, fan, and wall type heater. Two of the bedrooms were furnished with electric steam radiators and the third with a portable heater. All three were well equipped for convenience and comfort with warming pads, curling irons, fans, and immersion water heaters. Portable heaters were supplied for the library and bath, and an electric sewing machine was a feature of the sewing room. Tasteful lighting fixtures and wall brackets provided adequate illumination throughout, supplemented by floor lamps. Two vacuum cleaners were included in the household equipment.

Five meters—the master meter and one for cooking, one for air heating, one for water heating and one for lighting and appliances—were installed, with the idea of obtaining accurate data on the cost of operating an electrically equipped home. Tully R. Cornick of the Cornick Electric Company believes that the figures eventually secured will be of material assistance in overcoming the sales resistance so often encountered in the sale of heavy duty electrical equipment.

The home was kept open for eight days, and during that period over four thousand people visited it. On one day a lecture on cooking by electricity was given by J. C. Douglas, representative of the Edison Electric Appliance Compaiy, which attracted an attendance of over four hundred. No effort was made to solicit orders for any of the appliances displayed, but visitors were personally conducted through the house, and the installation and the advantages of the various devices were explained in detail.

Advertising and publicity in connection with the exhibit were handled by Fred W. Rea of the Pacific States Electric Company, San Francisco, Calif.

How to Make Wrapping Counter Create Additional Sales

The average customer probably spends more time at the dealer's wrapping counter than in any other part of the store. It is quite surprising therefore to note that many dealers fail to take advantage of this fact, and make no provision to command the customer's attention while the package is being wrapped. Some dealers, however, have taken it upon themselves to put circulars and display racks at the wrapping counters, and others have arranged displays of the smaller items of merchandise. The space immediately adjoining the wrapping counter is of material assistance in promoting lamp sales. An adequate display of the various sizes and types of Mazda lamps at such a location will always attract attention. Once the consumer's interest is aroused, it is a simple matter to make a sale.

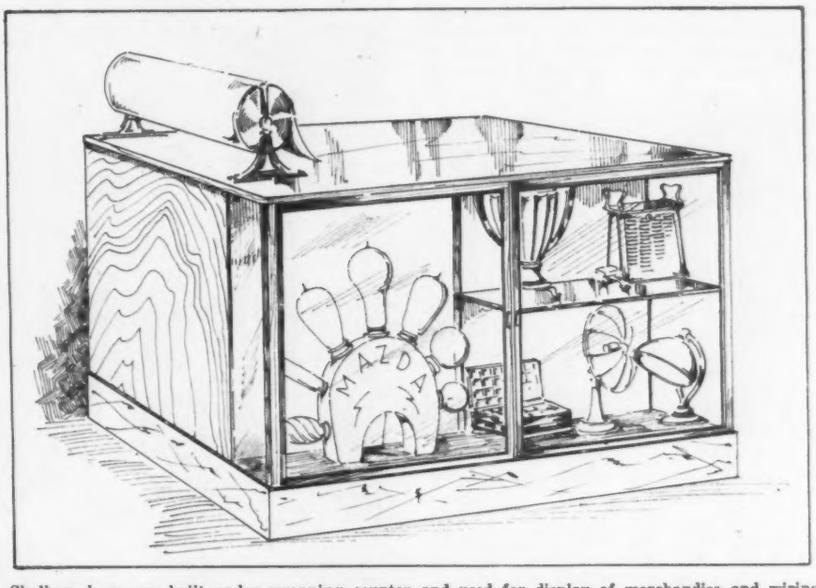
By using these display cases for exhibiting convenience outlets and other auxiliary devices, the contractor-dealer can work up a considerable volume of additional wiring business.

Electrically Equipped Cafe in Utility's Former Home

The former office building which for more than twenty-five years housed the offices of the San Diego Consolidated Gas & Electric Company, San Diego, Calif., was bought recently by two well known restauranteurs of that city. Because of the nature of the use to which it was formerly put, it has lent itself admirably to complete remodeling as a modern, well equipped dining place. The restaurant, known as the Cabrillo Cafe, was opened recently.

Electrical appointments of the new cafe are numerous. The private bakery, located in the basement, in what was formerly a substation, is entirely electrical. An electric baking oven, electric mixers, and, nearby, the private ice plant are all logical consequences of the former use of the building. The kitchen is equipped with many electrical conveniences, as well as apparatus employing gas and steam, the other two products sold by its former occupant.

Lighting of the large dining room, the mezzanine floor, the banquet hall and dancing salon and private dining rooms on the second floor, has been designed with a view to tastefulness as well as utility. Electrical installation under the new owners was made by the Southern Electrical Company.



Shallow show case built under wrapping counter and used for display of merchandise and wiring devices. By showing convenience outlets, radio outlets and other auxiliary equipment, dealers open up avenues to additional wiring business.

BETTER MERCHANDISING

Demonstrate Electrical Devices in Modern Home

First Electric Home in Aberdeen, Wash., Gives Dealers an Opportunity to Display Electric Equipment

By F. P. THOMAS

Demonstration of the adaptability of electrical devices to tasks of the housewife continues to be one of the best means of selling this class of merchandise. This undoubtedly is the reason for the popularity of the electric home, not only in the West, but in all parts of the United States where the electrical industry is anxious to increase the use of electricity and electrical labor-savers.

The fully electrified home has ceased to be a curiosity, and, as such, a thing to be looked upon as something nice to have but not to be enjoyed by the average home-owner. Effective educational campaigns, followed by equally well directed sales drives, have done much to inform the public that electrical comforts can be had at small cost compared with the added advantages that are secured. The original electric homes were largely regarded as "freaks" which had been prepared merely as settings for a large quantity of electric equipment that had no place in the average home. Consistent advertising and salesmanship have now convinced the housewife that to get the most out of life she must employ electrical devices in her home.

Typical of the modern electric home is the one recently displayed in Aberdeen, Wash., by the electrical industry of Aberdeen and Hoquiam. The home was built for an individual who agreed to allow it to be displayed to the public for a period of five days. The home was erected according to the plans of the owner, the only difference from the usual procedure being that all contractors were informed that the home was to be displayed for the specified period. As the home was to be a model one electrically, the contractors of Aberdeen cooperated in offering suggestions and criticisms of the specifications and plans for the wiring of the house. In this way the installation was the result of the combined judgment and experience of the electrical contractors and represented what they considered an ideal and practical arrangement of wiring outlets and fixtures for a modern home. The idea of the committee in charge of presenting the display was to present a home installation which could be looked upon as completely modern and one in which the value of electrical devices could be shown easily.

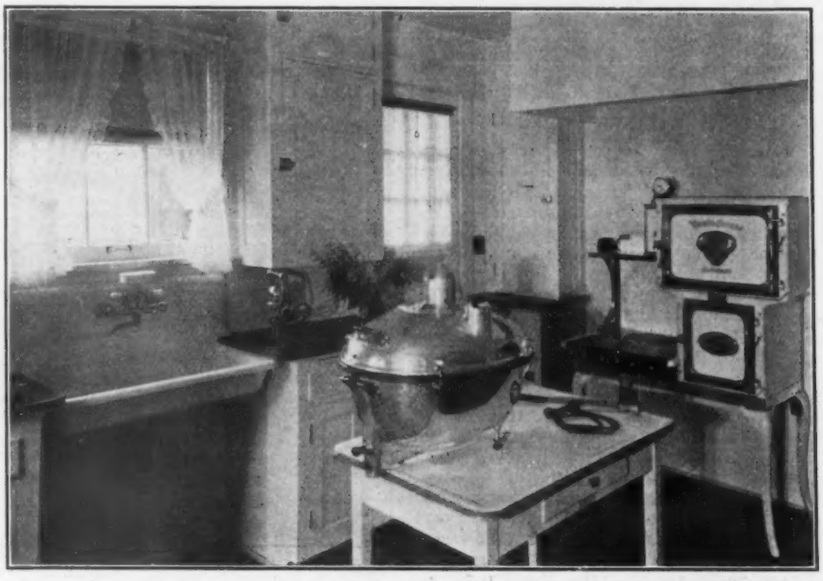
Preparations for this demonstration of the value of electricity to the housewife were all made prior to the time that the home was ready for display, and such care was taken in the laying of the plans that when the home was opened and visitors were admitted it was found that nothing of moment had been overlooked. Salesmen, acting as guides, were on hand all of the time that the house was open to the public and were ready to take groups of ten or twelve persons through the modern home. By limiting the number of persons admitted to a group, the salesmen were able to give individual attention to the visitors and were thus able to demonstrate the exceptional advantage of the electrical equipment installed in the house.

Instead of admitting the visitors at the front door, as has been the practice in many electric homes, a route was devised that started at the back door, led through the laundry, then to the kitchen and finally to the bedrooms and front part of the house. By taking the guests through the laundry and kitchen first, the committee capitalized upon the interest of the visitors, which was of course keenest upon first entering the house, and then finished the tour with the living rooms, which were more decorative. Another advantage of visiting the kitchen in the early part of the tour was found to be that the guests were ready and eager to spend more time in the first rooms that they entered than they were in those toward the end of the inspection trip. In this way the salesmen were given an excellent opportunity to demonstrate the many labor-saving devices that were installed in the laundry and kitchen, and yet when the groups arrived in the dining and living rooms they were also interested in the decorative fixtures and variety of lamps that were displayed there.

In addition to giving the visitors short lectures on the electrical equipment placed in each room in the house, the committee presented each guest with a souvenir booklet directing attention to the electrical conveniences in the home and giving suggestions to be followed in building a home or in purchasing a ready-built house.

During the five days that the home was open to public inspection, 3,157 persons visited the display and were shown the place of electricity in the modern home. Talks calling attention to the particular features of each room varied from two and one-half to four minutes, according to the number waiting and the interest evidenced by the group.

The souvenir booklet presented to each visitor supported itself through advertising paid for by local concerns interested in home-building. Other expenses involved in the display of the home were divided among the Grays Harbor Railway & Light Company, the electrical contractors and dealers of Aberdeen, and the company outfitting the home with furniture. The electrical firms entering in the sponsoring of the display were: A. B. C. Appliance Company, Arrow Electric Company, Electric Shop, Hoquiam Electric Company, Pacific Electric Company and Phillips Electric Company.



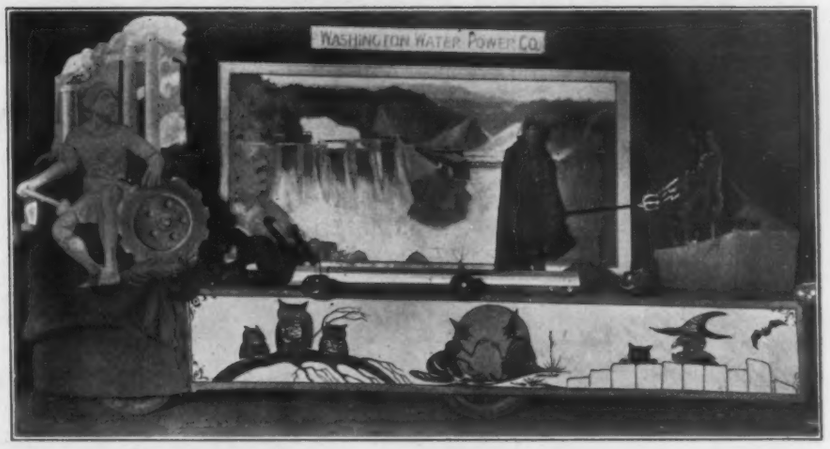
The kitchen was equipped with many modern labor-savers. Guides explained the utility of each device.

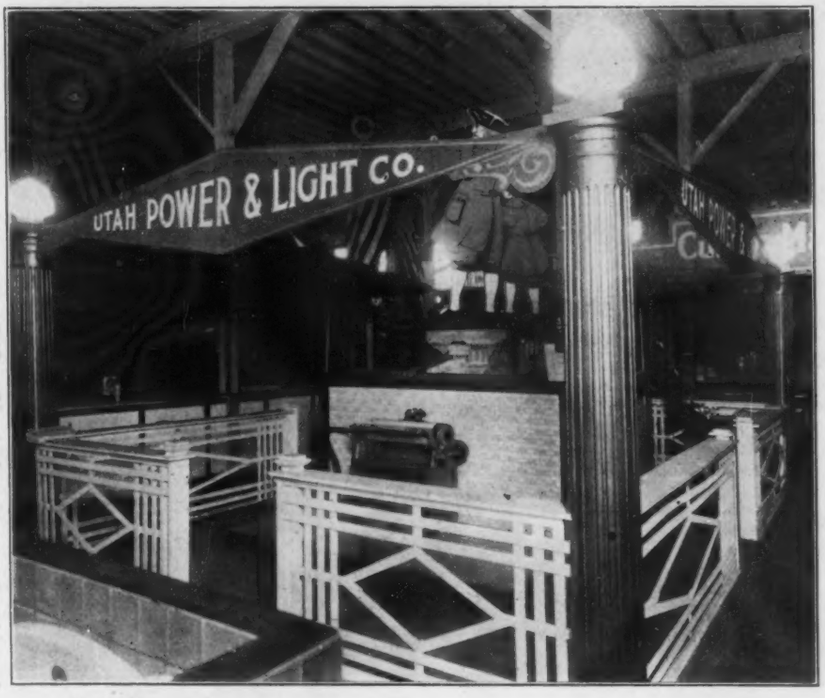
Institutional Advertising That Increased Business

Sales stimulating methods used by Western electrical dealers and central stations vary considerably with the time of year and with the general character of the territory served. On this page are shown three ideas used by Western companies to stimulate sales and to keep their names before the public.

The upper picture shows the float of The Washington Water Power Company that appeared in the Hallowe'en Parade held in Spokane, Wash., the evening of Oct. 31. This parade is an annual affair and is sponsored by the commercial and industrial enterprises of the city.

The float used by The Washington Water Power Company was mounted on a truck and as may be seen was designed to call the attention to the Long Lake development of the company. This plant was represented by an attractive oil painting which was illuminated by border footlights and was surrounded by appropriate Hallowe'en designs. On the forward end of the truck there appeared the figure of a man representing power. Electrically illuminated pumpkins also were placed around the float. The feature of the company's entry was the devil, armed with an electric fork with which he made jabs at a black cat. The man, representing the devil, would thrust his fork, which was wired from one terminal of a special laboratory high tension coil, at the black cat, which was connected to the other terminal of the coil. As soon as the fork neared the cat's head, blue sparks 6 in. long would pass between the two conductors, giving the display an exceptional appearance. The high tension coil was supplied with current by a small 120-volt motor-generator set driven by storage batteries.

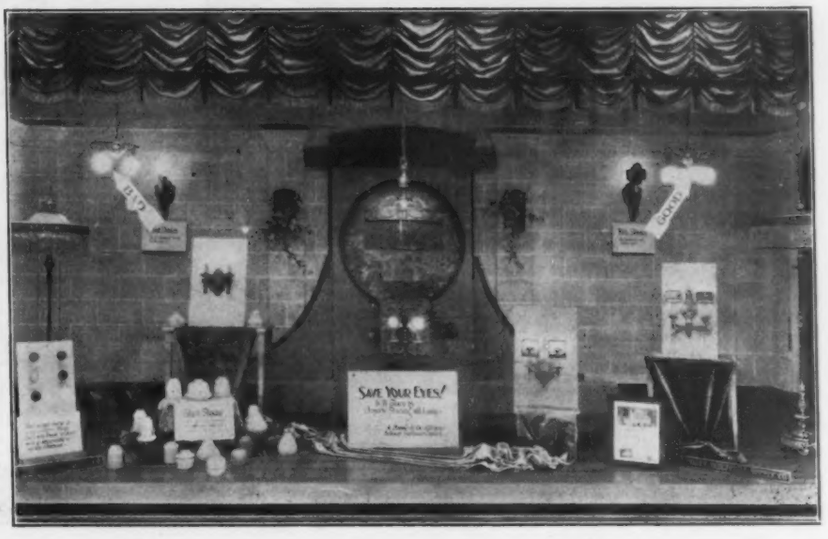




A different type of institutional advertising was used by the Utah Power & Light Company at the Utah State Fair, held in Salt Lake City, Utah, the first part of October. This company used one of the largest booths available at the fair and decorated it so artistically that the second prize for attractive displays was awarded to the company.

The exhibit was designed to trace electricity from its source, through the power station to the labor-saving devices used in the modern home. At the top of the booth appeared Benjamin Franklin with his kite. An electric power plant was reproduced in miniature, and around the base of the central stand were grouped various appliances. The $15,000 electrical home, to be given as first prize in the Home Lighting Contest, was also featured in a miniature display.

During the Better Home Lighting Contest, the Valley Electrical Supply Company of Fresno, Calif., used its window display space to attract attention to the contest and to show the need for better home illumination. The window display shown at the lower right was exceptionally efficient in aiding the company to broadcast the better lighting message and no doubt was largely responsible for the success achieved in the Better Home Lighting Contest in Fresno. One of the features of the display was the method of showing good and bad lighting.



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$19.00
ONE DOLLAR
LAUNDRY PROBLEM
A down payment of $1 was featured by the Public Service Company of Colorado in a recent campaign on electric washing machines. The balance due on the machine was prorated over sixteen months. Window displays, similar to the three shown on this page, were found to be excellent means of interesting the public. Salesmen capitalized upon the interest aroused by displays and advertising.

Goof, the Get-Byer, Spurns Fortune's Ambassador

By Joe Osier

Ol' Man Opportunity, a dejected figure of a beaten man, hobbled down the road into the dusk, nursing a set of bruised knuckles, for—

"Goof Spurns Opportunity's Call."

He had just completed a full eight-hour shift at the door of I. M. A. Goof, a man of the electrical industry, who, let it be heralded, had refused to give him a tumble.

True, Goof had heard the summons; in fact, he had been afraid that Opportunity's banging would split the panel of the door, but,

Because he was busy cussing his hard luck, and manufacturing rain, he turned a deaf ear to the entreaty, saying—

"Why should I answer that old fool's knock? What do I want with Opportunity? I have had plenty of it in my time, and what did it get me?

"More work, more responsibility, more worry."

And so Fortune's ambassador slipped away into the night, the while making ready to resume the siege at some other man's door, and

Goof, the welcomer of woe, invented a few more invectives to spring on the Chamber of Commerce crew at the next luncheon.

Each day, so the fable goes, Opportunity ankles forth gaily, eagerly seeking for the doors of men who await his summons.

This knock, if answered, it is said, means that defeat will be changed into victory; despair transformed to gladness, and misfortune to success.

He brings a message of joy to the down-and-outer, breathes the breath of life into projects long dead, and presents a welcome to ones on the way to the heights.

And for his gifts, he asks nothing but sincere effort, honest purposes and lofty ideals.

The boon he bestows cannot be bought, nor can it be obtained through influence. It is a gift—a free-will offering proffered to those who by their actions have shown that they are ready and right to receive it.

Of course, even Opportunity makes mistakes and places his pearls before swine, as—

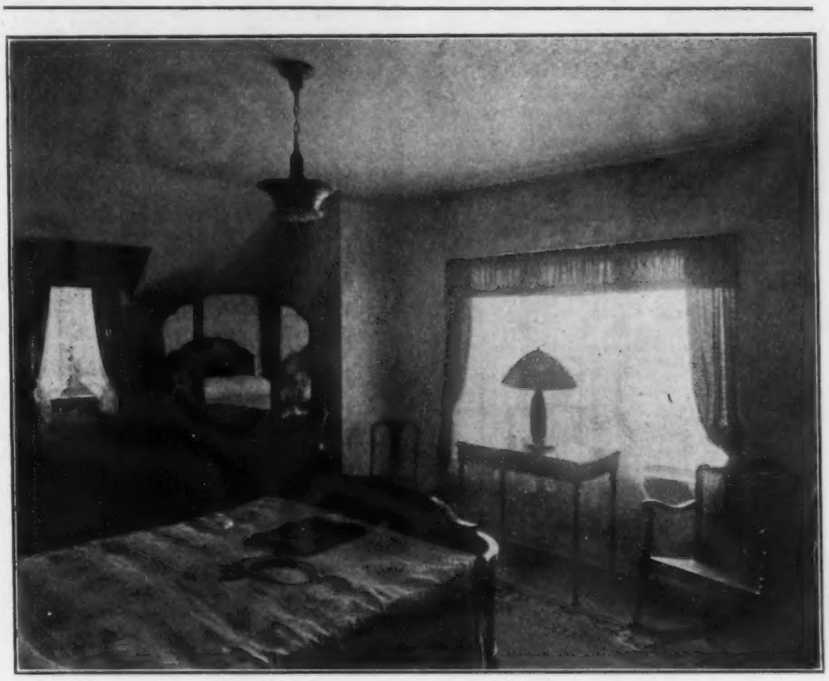
Witness the case of I. M. A. Goof, but ordinarily he picks his man, who in turn—

Clasps the chance to his bosom and starts running toward the heights, where lie ambitions fulfilled and achievements attained.

So let this be your motto:

"Answer all knocks, they may be boosts."

Interior of living room of Salt Lake City's third electric home that was visited by 7,500 people during the nine days that it was open. The home was built for sale by a contracting firm, and arrangements were made by the electrical industry of Salt Lake to display it as an electric home.



One of the bedrooms of the Salt Lake City electric home. Particular attention was paid to the lighting as at the time of the exhibit the Better Home Lighting Contest was in progress. The committee in charge of the display included: E. H. Eardley, manager, Eardley Electric Company; G. R. Randall, manager, Salt Lake Electric Supply Company; L. B. Johnson, General Electric Company; E. A. Evans, Westinghouse Electric & Manufacturing Company.

NEWS OF THE INDUSTRY

Second Unit Is to Be Added to Valmont Steam Plant

To meet the expected demand for electric power in Colorado cities and the Moffat Tunnel, when completed and electrified, the Public Service Company of Colorado is planning to double the capacity of the present power plant at Valmont, near Boulder, by adding a second unit to cost approximately $750,000, according to H. H. Kerr, superintendent of the electrical department of the company. The first unit of 20,000-kw. capacity was put in service Nov. 30, 1924. (Journal of Electricity, Dec. 15, 1924, p. 456.)

A dam, to be 3,500 ft. in length with five subsidiary dams, to cost approximately $1,100,000, also is planned. Construction on both projects will be started in the present year, probably by late summer or fall, according to Mr. Kerr, inasmuch as bids have already been requested.

A third unit will be added to the Valmont plant in 1928 or 1929, according to present plans of the company. Construction of this unit, however, may hinge on whether or not the entire Moffat railroad is electrified between Denver and Tabernash.

According to C. A. Semrad, vice-president of the Public Service Company, the decision to complete plans immediately for additions to the Valmont plant, which has cost $5,000,000 to date, was made following the rapid development of the use of electrical power in northern Colorado. With the completion of the second unit the plant will have a capacity of 50,000 kw.

Final decision was made by Doherty officials last week as the result of a conference in New York attended by C. N. Stannard, vice-president and general manager of the company, G. W. Faller, assistant vice-president, J. E. Loiseau, secretary, and V. L. Board, general superintendent.

Policy of San Joaquin Company Will Not Be Changed

The San Joaquin Light & Power Corporation will remain strictly a local company and will be operated by local men, according to H. P. Wilson, president of the Western Power Corporation which recently purchased the control of the Fresno utility. No change in policy or personnel is contemplated, states the holding-company executive.

Mr. Wilson has also announced that A. G. Wishon, now vice-president and managing director of the San Joaquin company, will be elevated to the presidency of the company and that A. Emory Wishon, at present general manager, will remain in his present position and will have additional responsibility as vice-president. A. G. Wishon has been actively in charge of the power company for twenty-two years.

California Electrical Bureau to Replace "Coop. Camp."

Basic changes affecting materially the California Electrical Cooperative Campaign were adopted at the meeting of the advisory committee of that organization held at Del Monte, Calif., Feb. 1. At this meeting the committee, deciding that there was a need for an electrical educational and promotional organization that would provide constant contact with the general public in California, officially changed the name of the organization from the California Electrical Cooperative Campaign to California Electrical Bureau. It was felt that the "Campaign" period had been passed and that there was a need for a permanent electrical organization.

Other changes in the association's activities involve the programming of activities for a three-year period and the inclusion of new representatives from jobbers and dealers. The changes were sanctioned by an unanimous vote of the advisory committee.

The official announcement issued by the California Electrical Bureau is as follows:

So rapid is the progress of the electrical industry in California that there is need of a constant contact with the general public by some neutral educational representative of the entire industry.

For the past seven years that need has been filled by the California Electric Cooperative Campaign.

Now, however, it is realized that the greater the growth of the electrical industry the wider is the potential scope of such an organization's activities; and the greater the field of its accomplishments.

Anticipating the broad achivements which the future holds for the electrical industry of California, and believing that the permanence of the industry merits a permanence in its representative organization, the advisory committee has expressed the opinion that the "Campaign" period has passed and, therefore, announces that the name of the California Electrical Cooperative Campaign has been officially changed to

CALIFORNIA ELECTRICAL BUREAU
Educational Promotional

Offices will be maintained as before at 314 Rialto Building, San Francisco; 631 Cotton Exchange Building, Los Angeles, and 1229 Broadway, Fresno.

Two other basic changes involved in the above decision are as follows:

The programming of the Bureau's activities over a three-year period, with the establishment of a definite goal to be worked toward during that entire period.

The inclusion of new units among those represented by the Bureau by extending invitation to participate to wholesalers and retailers who have not heretofore contributed or had representation upon the advisory committee.

Edison Company to Build Substation at Arcadia, Calif.—Construction has been started on a 1,500-kw. substation to provide an ample supply of power for the Monrovia-Arcadia district of the Southern California Edison Company. The plant will be located at Lower Azusa Road and El Monte Street just adjoining the southern and western city limits of Arcadia and will be known as Anita substation. It is expected to be in operation before the end of March.

Disposal of Colorado Springs System Is Completed

The municipality of Colorado Springs, Colo., has taken another step looking toward the ultimate absorption of all electric interests of the company formerly serving that community. The franchise of the Colorado Springs Light, Heat & Power Company expired Sept. 8, 1923, (Journal of Electricity, July 15, 1923, p. 65). Following the purchase of the steam generating plant and distribution lines of the company within the corporate limits of the city at a price of $600,000 in August, 1924, (Journal of Electricity, Aug. 15, 1924, p. 142), the next problem was the service to be rendered the smaller independent communities in the Pike's Peak region.

This was solved Jan. 26 when the bondholders' protective committee of the Colorado Springs Light, Heat & Power Company, headed by George Reilly of Philadelphia, accepted the offer of the city to purchase outright all other electric interests outside the city for $250,000.

Action resulted at a conference between the two interests and James H. Causey, Denver capitalist and investment banker, who is to take over the entire issue of municipal revenue bonds issued by the city for payment on the property. This marks the final disruption of the company's electrical system, the steam heating system already having been closed down because of financial losses. The gas plant is all that remains, and it is understood that Mr. Causey is a probable purchaser of that.

Delivery of the company's interests will be made to the municipality on July 1, by which time the city's new half-million dollar steam generating plant is expected to be ready to tie-in with the present distributing system.

The Colorado Springs company has already closed its commercial office and sales room, all merchandise and appliances having been sold at very low prices during the holidays.

Alleged Electrical Monopoly Is to Be Investigated

Investigations by the Federal Trade Commission of alleged monopolies in the electrical and tobacco industries were ordered on Feb. 9 by the United States Senate. The investigation of the extent to which the General Electric Company or its subsidiaries are alleged to monopolize production, generation or distribution of electric energy, will be made as the result of a resolution prepared by Senator Norris of Nebraska and attached as a rider on the tobacco-investigation resolution.

An amendment calling for an investigation into the existence of national propaganda to discourage public ownership of utilities was attached to the Norris resolution before it was appended to the tobacco resolution.

H. P. Wilson Comments on Great Western-San Joaquin Merger

H. P. Wilson, president of the Western Power Corporation and vice-president of the Great Western Power Company of California, in an interview with a member of the staff of the Journal of Electricity during his recent visit to San Francisco, declared that the purchase by the Western Power Corporation of the San Joaquin Light & Power Corporation will play an important part in the electrical development of California.

The two systems, he stated, are ideally situated for interconnection, and the load characteristics and potential possibilities of the territory served are such that the purchase was but a natural step in the ultimate development of the properties. According to Mr. Wilson, there is available on the two systems a total of 1,000,000 kw. in potential hydroelectric energy, all of which will possibly be developed within the next ten or twelve years provided the growth of the state continues as it has in the past.

Engineering studies are being made at the present time, he said, which will determine the future power-development program. He believes that the systems have sufficient installed generator capacity to carry them through the present year. In the meantime, however, work will proceed on the raising of the Big Meadows dam at Lake Almanor and upon the construction of a tie-line between the two systems. Definite announcements regarding both of these developments will be forthcoming within a few weeks.

H. P. WILSON

Mr. Wilson definitely set at rest rumors regarding the Eastern financial interests behind the purchase when he said, "Neither the Byllesby Engineering & Management Corporation nor the Electric Bond & Share Company have one dollar invested in the Western Power Corporation".

Commenting upon the attitude of Great Western toward the City of San Francisco and the Hetch Hetchy development he said:

"Great Western is not antagonistic toward the City of San Francisco and its Hetch Hetchy development. We feel, however, that the people of that city will recognize the facts and will not make the fatal error of engaging in municipal distribution of electric energy. Rather than engage in an enterprise which, from the outset would be fraught with difficulties incident to political management, I believe that the people of San Francisco will reach the conclusion that the most economic method of protecting their investment will be to distribute the energy through the agency of one or both of the existing utilities serving the city. It rests with the people to decide. If they should vote to attempt such a hazardous undertaking as municipal distribution, this company will of course have to abide by their decision. All that we ask is a fair and square deal to the end that the investors in our securities will be protected.

"I, for one, feel that ownership by the people on a partnership basis is far better than public ownership. That is the policy which will be pursued by Great Western. We want all of the people in the state as our partners. Just how well we are accomplishing this can be judged from the statement that during the month of January approximately $700,000 worth of our preferred stock was purchased on a customer-ownership basis."

Mr. Wilson is very optimistic over the business outlook for California for 1925 and stated that his company is ready to proceed with power development as rapidly as the requirements of service demand.

Premature Blast Kills Four Men In Florence Lake Tunnel

Four men were killed and one was injured Feb. 4 by the premature explosion of a blast of dynamite in the Southern California Edison Company's Florence Lake tunnel nearly 100 miles northeast of Fresno.

According to a statement issued by the company, a number of blast holes had been drilled in soft ground, in which electric firing was not being used. The drilling and mucking crews had left, and the powder crew had gone in to place and fire the blasts. Evidently two fuses were cut too short by mistake and the dynamite exploded before the men could reach a place of safety.

It is not anticipated that the accident will delay the completion of the tunnel, which is expected to be finished between the 15th and 20th of this month.

Order Survey of Skagit Project In Recent Ordinance

As the next step in the Skagit River power development by the city of Seattle, the city council has passed an ordinance appropriating $12,000 to defray the cost of a complete survey of the proposed addition to the present development on the river, to be made by a commission of three Seattle engineers. Coincident with the passage of the ordinance, the council named the following men to compose the commission: William C. Morse, consulting hydraulic and hydroelectric engineer; Stirling B. Hill of the firm of Parker & Hill, consulting civil and hydraulic engineers, and Joseph Jacobs of the firm of Jacobs & Ober, hydraulic engineers. The ordinance provides further for a study of the municipal distribution system by a second commission of engineers with a view to determining its needs. This commission has not yet been appointed. Mayor E. J. Brown has not yet approved the ordinance, but it is pointed out that, in the event of a veto, it may be passed over such veto.

All the basic data on the Skagit project assembled by municipal officials will be turned over to the engineers. Their survey is not expected to require more than three months.

State Power Act Has Bearing On Projects In Oregon

Advocates of the Clear Lake water and power project on the McKenzie River, Ore., are watching with interest the progress of the resolution to be proposed by Senator Joseph, Multnomah County, to the Oregon State Legislature, which would refer to a vote of the people an amendment to the constitution permitting the state to go into the power business. The Clear Lake project was intended primarily to deliver mountain water from this lake, which is near the source of the McKenzie River, to the towns in the low-lying Willamette Valley. Because of the cost of the project it was expected that several towns from Salem to Eugene would unite in a water district. Estimates have been made tending to show that in connection with this project, about 50,000 hp. could be developed and delivered to these towns at a cost that is practicable, and the advocates of the project believe that, if the proposed state power bill eventually becomes a law, the way will be made easy for the realization of their plans to develop their project.

In his message to the legislature Governor Pierce urged the passage of the state power resolution, saying that he believed in this as a principle. He further stated that he advocated the development by the state of the Clear Lake power project, and that he also urged "that everything possible be done to encourage the construction of a plant at Umatilla Rapids (on the Columbia River) for electric and power purposes."

Seeks Abolishment of Colorado Utilities Commission

The abolishment of the Public Utilities Commission of the State of Colorado is asked in a bill just submitted to the Colorado legislature by Senator J. F. Coss of Walsenburg, Colo. In its present form the bill provides for the transfer of the commission's supervisory power to the attorney-general.

According to reports, there is a three-cornered fight behind the promotion of this measure. One angle concerns the present power of the commission to regulate common-carrier bus service on the state highways; another the action of the commission in recently granting a franchise to a company for natural gas distribution over a large part of the state when that company was not engaged in production or sale of oil or gas; and the last is the apparent desire to eliminate commission control in the case of those municipalities not functioning under Colorado's home-rule amendment. This chiefly concerns privately owned electric plants.

It is definitely understood that this is not a so-called administration measure, yet it has an official relationship with the political promotion of cheaper power for Denver and other large cities. Committee action had not been taken on this bill up to Feb. 1.

Railroad Applies for License to Build Transmission Line in National Forest.—The Great Northern Railway has applied to the Federal Power Commission for a license to erect a transmission line thirty miles long in Wenatchee National Forest, Chelan County, Wash., connecting Cascade Tunnel with the railroad's power plant.

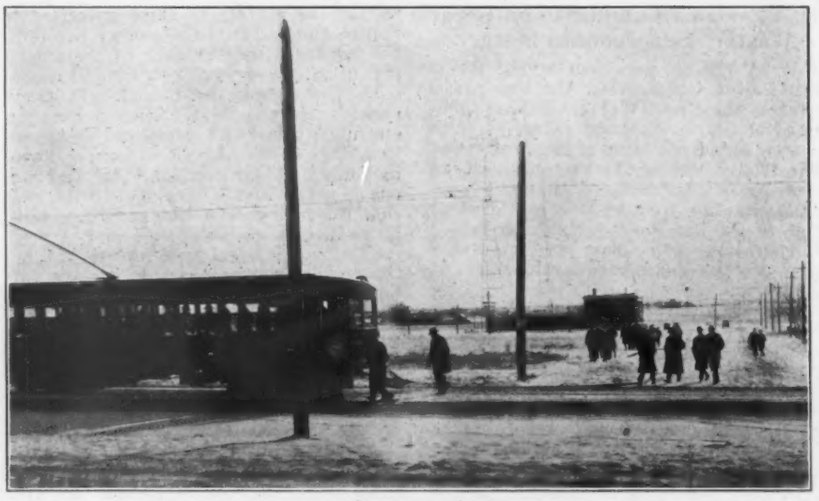
The Copco Forum Holds Third Annual Christmas Party

Christmas has come and gone, but the memory of it will linger long with those fortunate ones who attended the third annual Christmas party given by The Copco Forum. The Copco Forum is an organization composed of the employees of The California Oregon Power Company, Medford, Ore., and each year just before Christmas it gives a party which is sponsored and financed entirely by members of the organization and is given wholly independent of any assistance from the company. Plans for the affair are under way all through the year, and funds are raised from various Forum activities to help defray expenses.

The 1924 party was given on Dec. 20, and started off with a big turkey dinner at the Hotel Medford. An attendance of 375, including 150 children who were guests of The Forum, filled the main dining room and the small grill room, and it was even found necessary to place a number of tables in the ladies' parlor to accommodate those who came late.

During the dinner, ushers passed up and down the long tables with fancy party caps of every color and design which were immediately donned by young and old. These were followed by the distribution of horns and noise-makers which were put in use at once, offering keen competition to the orchestra which dispensed popular song hits throughout the meal.

After dinner was over, the party adjourned to the new Copco office building, which had been completed just in time to be dedicated by the Christmas party. Here Santa Claus, who was stationed beneath a huge Christmas tree, proceeded with the distribution of presents to the eager kiddies. Each child received a handsome present and a bag of candy, nuts and fruit. The presents had been carefully selected by the committee in charge of that detail and consisted of such substantial gifts as real watches, roller skates, baseball outfits, footballs, dolls, doll buggies and sewing outfits. Needless to say, the children were all delighted with their gifts, which presented conclusive evidence that there "really is a Santa Claus."



KOA new broadcasting station of the General Electric Company at Denver. One of the new street cars, recently put in service in Denver, and a group of utility men who visited the station may be seen in the background.

Denver Broadcasting Station Is Model Installation

Building material and equipment used in KOA, the new General Electric broadcasting station at Denver, Colo., if loaded on freight cars, would require a train forty cars long and heavily loaded, according to estimates of the constructing engineers. The station went on the air Dec. 15, 1924.

Approximately ten and one-half miles of copper wire ranging in diameter from the size of a needle to an old-fashioned clothes pin were required in the construction, in addition to a mile and a half of electrical conduit. Other items include 100 tons of structural steel, 2,500 sacks of cement, 127,000 brick, 65,000 bd. ft. of lumber and 485 cu. yd. of cand and gravel.

Each of the two towers which support the antenna system weighs twenty tons and is embedded in sixty tons of concrete. They are triangular in shape and 260 ft. apart and support the antenna which is 120 ft. long and 150 ft. above the ground.

Sleet and snow may be melted from the antenna system during winter months by causing a high current to flow through the antenna wires, thus raising the temperature, according to Harry Sadenwater, engineer in charge of radio technical operations for the General Electric Company, who supervised the construction of KOA.

The antenna is a multiple-tuned type with two down leads. Each of the three flat top cables consists of seven strands of silicon-bronze wire. Spreaders which support the antenna are 24 ft. long and are suspended by steel bridles from 4-ft. porcelain insulators. The counterpoise, which replaces the usual ground connection, is 17 ft. above the ground and is held in place by fifteen steel supports. As in the case of the antenna, one lead connects with the power plant in the rear of the studio building and generator room and the other with the tuning house. On account of high frequency, all steel and iron throughout the studios and power house and generator rooms have been grounded.

KOA marks a departure from the usual circuit arrangements in that a master oscillator-circuit is utilized to assist in obtaining constant frequency for transmission and freedom from harmonics. Two sets of transmitting equipment are installed and may be placed in service at once. This assures continuous operation should one set break down.

In the control room, which separates the principal studio and the speakers' studio, are three stages of speech amplification, made up of one 5-watt tube and two 50-watt tubes. A fourth stage is provided in the power house. The power tubes are the UV 207 type and are water-cooled.

For the present KOA will operate on a wave length of 323 meters. The power rating will be 1,500 watts. Credit for the installation of the new broadcasting unit at Denver is being given to H. D. Randall, Rocky Mountain district manager for the General Electric Company.

The kiddies thoroughly enjoyed the dinner which was one of the features of The Copco Forum's Christmas party.

Street-Lighting System Installed in Small Idaho City.—The town of Minidoka, Ida., has recently completed the installation of a modern street-lighting system, which makes it one of the best lighted cities of its size in the West.

Grays Harbor Company Files on Two Washington Sites

Two applications for permission to divert water from Washington streams for the purpose of hydroelectric development have been filed with Washington officials by the Grays Harbor Railway & Light Company of Aberdeen. The first is for rights on the Wynooche River in Grays Harbor County on virtually the same site as chosen by the city of Aberdeen for a municipal plant, and the other is on the Hoh River in Jefferson County.

The Wynooche River project calls for an appropriation of approximately 500 sec.-ft. of water, which will be used at a 200-ft. head. An application for a reservoir site in the Weatherwax Basin, capable of storing 80,000 acre-ft. of water, accompanies this application.

The estimated cost of development is placed at $1,700,000, and the capacity of the plant is estimated at 10,000 hp. The impounding dam is to be 150 ft. high, 300 ft. wide on top and 50 ft. wide on the bottom, and will be of concrete construction. The main canal is to be two and one-half miles long.

A temporary permit is held on this site by J. E. Malinowski, who has 60 days from Jan. 6, 1925, in which to begin construction work, under a notice issued by the state hydraulics department. The city of Aberdeen, which was to have received assignment of the permit, was prevented from developing the site when the courts declared illegal an election authorizing a bond issue of $2,000,000 for financing the project. (Journal of Electricity, Dec. 15, 1924, page 457.)

The Hoh River plant, on which only partial details were given in the application, calls for an appropriation of 4,000 sec.-ft. of water, which will be used at a 50-ft. head, generating 20,000 hp. The cost is not estimated nor was there a reservoir application filed. Details of the diversion dam were also lacking.

San Diego Company Occupies New City Garage Building

Placed in service just before the holidays, the new garage building of the San Diego Consolidated Gas & Electric Company, San Diego, Calif., located near the pioneer Station A, constituted for that company something of a Christmas present. Not only does the new unit provide storage space for the increasing numbers of pieces of transportation equipment, but the evacuation of the former garage has made it possible to enlarge the floor space of a number of shops which have long felt the need for more room.

Repair shop of the new garage of the San Diego Consolidated Gas & Electric Company.

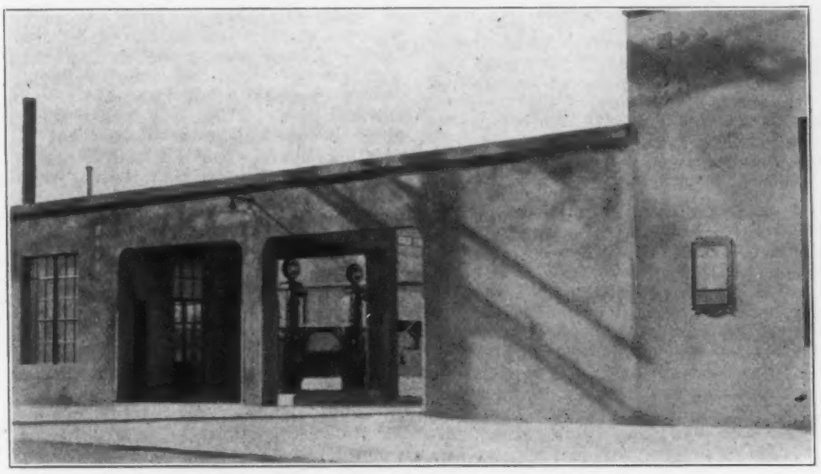
The new garage is located near the gas plant and takes the entire frontage of L street between Ninth and Tenth. Together with the large concreted yard which is enclosed by the service station, the garage utilizes half of the block. Offices of the garage and transportation clerks are located on the main floor at Tenth and L streets, with a private office for C. D. Weiss, the superintendent, at the corner. Upstairs are large storage rooms for supplies and files.

Next to the offices is a well-equipped repair shop. Two pits run lengthwise of the shop and make provision for work on as many as six cars or trucks at a time. An overhead traveling crane makes it possible to carry heavy pieces of equipment to any part of the shop. Numerous special pieces of tool equipment, such as work benches, are conveniently placed, and daylight is abundantly furnished through skylights and large fenestral windows opening on the street. The repair shop itself opens only on the yard.

Next to the repair shop is a special tool and stock room which in turn is connected to the storage rooms upstairs by a freight elevator. A feature of the garage is the room provided for tire repair work and for care of batteries. In it is a large hood which is designed to carry off battery fumes. Batteries are charged by means of a direct-current motor-generator set.

The large room for the storage of cars is equipped with roller doors opening on both the yard and the street and is deep enough to store four trucks in a row the entire width of the garage. Special oil-draining pits, car-washing stalls and other features are provided in this section of the building.

Of reinforced concrete construction throughout, the building is finished in cream-colored stucco, in conformity with the general plan adopted by the company for its buildings, and is decorated with green tile.



Entrance to concrete yard of garage with service station in foreground.

Seattle Commercial Lighting Rates Reduced.—The Seattle city council, on Feb. 9, passed an ordinance reducing commercial lighting rates on the municipal distribution system from 7 to 20 per cent. The reduction affects stores, buildings, hotels and other establishments in the business section. At the same time the council passed an ordinance over the mayor's veto calling for the appointment of three hydroelectric engineers to make an investigation of the Skagit River municipal power project. The three engineers will be Joseph Jacobs, W. C. Morse and Sterling B. Hill.

Wynooche River Permit May Be Canceled by State

Holding that J. E. Malinowski of Aberdeen, Wash., who was granted a permit in October, 1922, to appropriate approximately 700 sec.-ft. of water from the Wynooche River in Grays Harbor County, Washington, for hydroelectric development purposes, had not properly complied with the state law in the matter of development work, officials of the state hydraulics department have notified him either to begin construction work within sixty days from Jan. 6, 1925, or to show cause why his permit should not be canceled.

The permit in question involves the proposed development by the city of Aberdeen of a municipal hydroelectric plant and the construction of additions to the city water supply at that point, it was pointed out. Mr. Malinowski had assigned his rights on the stream to the city of Aberdeen and the city voted a bond issue of $2,000,000 on Dec. 1, 1923, to finance the plan of development. The department did not accept the assignment, as the matter was in the courts at the time, it was stated. The courts have prevented the city from going ahead with the project. (Journal of Electricity, Dec. 15, 1924, p. 457.)

It was intimated by officials that the present cancellation is but a forerunner of others which are to follow in cases where applicants have not pursued proper diligence in developing sites on which they have received tentative permits. It was further intimated that permits would not be issued in the future unless the applicant could show reasonable proof that the permit was being sought in good faith.

Request Bids for Cushman No. 1 Transmission Line

According to announcement of Ira S. Davisson, commissioner of light and water, Tacoma, bids will be received in February for the material and erection of the transmission line and switch towers, including the "Narrows Span" crossing Puget Sound, in accordance with section "L" of the specifications for the Cushman No. 1 power project now under construction by the city of Tacoma.

J. L. Stannard, chief engineer of the project, on return from a recent inspection of the work, stated that the dam is progressing satisfactorily, that the lining of the tunnels with concrete has been started, and that all but 2½ miles of the right of way for the transmission line between the plant and Hoods Canal has been cleared.

New Mexico Utility Will Erect New Steam Plant

Construction of a new steam generating plant for the Albuquerque Gas & Electric Company, Albuquerque, N. M., is to be started early this year, according to a statement recently made by Arthur Prager, manager of the company. The new plant, which will be built at Bernalillo, about 20 miles northeast of Albuquerque, will be operated in conjunction with the present steam plant in the latter city, to which it will be connected by a high-voltage transmission line.

Tentative plans cover the building of a steel and concrete, fireproof power house with an initial plant installation of 7,500 hp. Steam pressure will be about 400 lbs. per sq.in. Design and construction work will be in charge of the engineering department of the Federal Light & Traction Company of New York, of which the Albuquerque company is a subsidiary, and the new power house is expected to be ready for use by early fall of this year.

Coincident with the announcement of plans for the new plant, a reduction of rates was made, effective in January. The lighting rate was reduced one cent, making the new rate 12½ cents per kw-hr. in the first block and 8 cents per kw-hr. in the second. Reductions in the general large power, general small power, and miscellaneous power rate schedules also were announced.

Bridge River May Be Developed by B. C. Electric Co.

The purchase of the power site and permits of the Bridge River Power Company on Bridge River in British Columbia is being considered by the British Columbia Electric Railway Company, Ltd., of Vancouver. An extensive survey and investigation of the potential power possibilities of the project have been made by the Vancouver utility. It is understood that the directors of the company will decide during the present year whether to purchase the Bridge River site or to install an additional plant on Stave River.

The Bridge River site (Journal of Electricity, Feb. 1, 1925. p. 88-9) is estimated to have an ultimate capacity of 335,000 kw. The proposed initial development of the Bridge River Power Company called for the installation of three 20.800-kva. units to be driven by three 25,000-hp. impulse water wheels operating under an effective head of 1,140 ft.

Jury Fixes Value of Property Condemned by Loveland

The city of Loveland, Colo., must pay the Public Service Company of Colorado $116,227. This is the total amount fixed by a jury in the district court at a hearing held recently at Fort Collins to arrive at a valuation of the company's property in Loveland that the city is taking over by condemnation for use in connection with its recently completed municipal power plant. (Journal of Electricity, Dec. 15, 1924. p. 458.)

Of the amount fixed, $113,350 was set as the valuation of the property taken over, and $2,877 as damages to the property not taken over. At the hearing, which consumed a week's time, the Public Service Company endeavored to establish the valuation of the property at $160,000 to $165,000, while the city of Loveland attempted to have the figure set at from $83,000 to $90,000.

Application Filed for Water Appropriation for East Bay Municipal Utility District Water-Supply Project.—Application has been made by Stephen E. Kieffer of San Francisco to the Department of Public Works, Division of Water Rights, for permission to divert 200 sec.ft. of water from the Mokelumne River for the generation of hydroelectric energy. The application is made in connection with the proposed project of the East Bay Municipal Utility District to provide a water supply to Oakland, Alameda, Berkeley and neighboring cities.

Lewiston Property Taken Over By Portland Company

Following confirmation by the court of the sale of the properties of the Washington-Idaho Water, Light & Power Company, Lewiston, Idaho, to L. B. Hatch of New York, announcement has been made that this property has been transferred to the Inland Power & Light Company and will be operated by the Pacific Power & Light Company, Portland, Ore. The Lewiston property, which was bought for $1,125,000 (Journal of Electricity, Nov. 15, 1924, p. 378), consists of the light and power business in Lewiston and Lapwai, Idaho, and Clarkston and Asotin, Wash., supplied by two hydroelectric generating stations on Asotin Creek, one of 1,500-kw. and the other of 400 kw. capacity, with a 22,000-volt transmission line connecting the four towns. A further source of supply is furnished through a connection with The Washington Water Power Company, Spokane, Wash., over a line north to Moscow, Idaho. Likewise included in the property is the domestic water system of Clarkston, with some irrigation business.

The Pacific Power & Light Company has commenced surveying a right of way for a 66,000-volt line from Pomeroy, Wash., to Lewiston, a distance of about 30 miles, which will connect the new property to the Yakima-Walla Walla power system of that company. This line is projected for construction next summer.

New Offices for Executives of Great Western Power Company.—Offices of the executives and of the legal counsel of the Great Western Power Company of California in San Francisco are now situated on the fourth floor of the Standard Oil Building, 225 Bush Street. The general offices, including the heads of all departments, will remain in the company's building at 530 Bush Street. The building at 435 Sutter Street, recently purchased by the Great Western company, is rapidly being remodeled, and upon completion will be occupied by the San Francisco division offices, which have been located at 347 Grant Avenue for a number of years.

Telluride Power Company Files Application to Divert Water from Sevier River.—Application to divert 100 sec.-ft. of water from the Sevier River to be used to produce an estimated total of 1,900 hp. has been made to the state engineer of Utah by the Telluride Power Company, Salt Lake City. According to the filing, the water is desired to supplement the capacity of its existing plant. For the same reason the company has filed on 12 sec.-ft. of water from Panguitch Creek to be used to develop 250 hp. in case of need.

Arizona Asks Water Parley.—Concurrent resolutions have been introduced in both houses of the Arizona State Legislature calling for the appointment of a committee of five to meet with committees from California and Nevada for the purpose of adjusting and determining the respective rights and interests of the states in regard to the Colorado River and the Colorado River Compact. The committees would report to the legislatures of the three states.

Pacific Coast Electrical Association

Technical Section Bureaus Report on Meetings

Active Discussion and Important Character of Work Undertaken Reflected in Chairmen's Official Reports

The conclave held by the Technical Section of the P.C.E.A., Jan. 7, 8 and 9 at the Fairmont Hotel in San Francisco constituted one of the most successful series of meetings of this nature ever held. This is true both in the large attendance and in the amount and quality of the work accomplished. All bureau reports have not been submitted for publication as yet, but those which have been completed and submitted by the bureau chairmen are published herewith.

Accident Prevention Bureau

J. M. Buswell, chairman.

Training in first aid and resuscitation, its value to men, to the companies, and to the public alike, and the success of conducting such training through competition were thoroughly treated in a report from Dr. C. E. Mordoff of the San Joaquin Light & Power Corporation. This was read by the chairman, J. M. Buswell of the same company. Discussion followed.

"Safety Bulletins" as reported upon by F. V. Wright, of The Southern Sierras Power Company, evoked discussion and brought out the fact that adequate bulletin service properly handled was decidedly beneficial to all concerned.

A "Course in Accident Prevention for Linemen", published by the N.E.L.A., was discussed, and it was decided that wide distribution of this booklet by all member companies would effect a good foundation for safety training. Study of this, or courses modeled along the lines given in this publication, stimulated by periodic tests and friendly competition between various groups, would nicely balance the semi-technical training now given by several companies to employees to fit them for responsibilities that are growing with the systems. F. A. Brown, of the Southern California Edison Company, was not able to be present to submit a report on this subject at this time.

"Safe Practices" were discussed, and it was agreed that a study of such should go along with an accident-prevention course. W. L. Smith, of the Los Angeles Bureau of Power & Light, was not present to report upon this phase of the work.

Tools, improvised or otherwise, that would lend themselves better to safe usage than some present tools is a subject which S. M. Bullis of The California Oregon Power Company has up for report at the March meeting. Mr. Bullis succeeds H. L. Walther as the representative of that company.

"Forms of Company Safety Organizations", assigned to E. J. Kendall of the Great Western Power Company of California, evoked much discussion. Experiences with various forms were considered and it developed that the local committee form, where the memberships are rotated frequently, is the most efficient, especially when coupled with a definite system for continuous inspection and instruction. Under this system the workers themselves are given definite responsibilities and thus take a more personal interest in safety work.

A standard "Safety Code" is being prepared by the Pacific Gas and Electric Company and V. R. Hughes of that company is to canvass member companies for any codes they may be using now and for suggestions as to the proper scope for an enforcement of such a code.

The establishment of confidence in accident-prevention work and appreciation of its necessity is one of the most important efforts of this bureau. Practical schemes of accident prevention that can be applied in an economical way can be worked out and will prove beneficial to all concerned. Systematic accident records which could be compared between companies from year to year are suggested as aids to the cause.

J. C. Gaylord of the Southern California Edison Company reported on the St. Louis meeting.

Hydraulic Power Bureau

R. M. Peabody, chairman, S. F. Coghlan, secretary.

Mechanical reliability of water power plants was the first subject discussed. This subject is the one assigned to subcommittee No. 1 of the national hydraulic power committee and is sponsored by the Pennsylvania Section of the N.E.L.A. Copies of the questionnaire issued by the Eastern body were distributed and discussed. The information asked for can be obtained, and an effort will be made by member companies to complete the questionnaire before the March conclave.

Hydro plant layout is the main subject of the year for the P.C.E.A. and likewise the subject assigned to subcommittee No. 2 of the national organization. Reports of this subject were submitted by six member utilities as follows:

Bureau of Power & Light, Los Angeles.

The California Oregon Power Company.

Pacific Gas and Electric Company.

San Joaquin Light & Power Corporation.

Southern California Edison Company.

The Southern Sierras Power Company.

High-head plants covered in the reports were of both the turbine and the impulse type operating at heads of more than 400 ft. Turbine plants were Pit No. 1 of the Pacific Gas and Electric Company, Kern River No. 3 and Big Creek No. 3 of the Southern California Edison Company, and San Francisquito No. 2 of the Bureau of Power & Light. Impulse plants were Leevining Creek No. 1, of The Southern Sierras Power Company, San Joaquin No. 1 of the San Joaquin Light & Power Corporation, and Big Creek No. 1 of the Southern California Edison Company.

Medium-head plants operating at heads of from 100 ft. to 400 ft. reported upon were Pit No. 3 of the Pacific Gas and Electric Company, Copco Nos. 1 and 2 of the California Oregon Power Company, and the Kerckhoff plant of the San Joaquin Light & Power Corporation.

The only low-head plant covered in the reports was the Klamath Falls East Side plant of The California Oregon Power Company. Details of these various plants were discussed. Information contained in the reports will be arranged in tabular form for submission as a final report of the activities of the bureau.

Meter Bureau

G. H. Searle, chairman, J. E. Bridges, secretary.

The meter course at the University of California will be held in two sections this year, according to the proposed plans of A. L. Duesbury, Western States Gas & Electric Company, subcommittee chairman. The cost of the course will be $8 per student. To lessen the congestion in the laboratory and to make the course available to a greater number of meter men, the committee will endeavor to arrange for an elementary section to be held at Los Angeles in addition to the two sections at Berkeley.

Nothing was reported this time by E. Ealson, Southern California Edison Company, who heads the subcommittee on the use of oil in meter bearings.

The influence of wave form on relay operation and the best test method by which reliable operation may be obtained are subjects under investigation by the subcommittee on relay maintenance, headed by J. C. Albert, Los Angeles Bureau of Power & Light. Charts were exhibited showing the characteristic curves of three different types of relays when operated on currents of the same effective value but of different wave forms. Shorter time values were obtained obviously with a sine wave than with other wave forms. Further tests and investigation are to be made. Recommendations for a standard system of relay testing will be included in the final report.

Results of tests on a bushing-type current transformer were reported by W. N. Lindblad, Pacific Gas and Electric Company, chairman of the subcommittee on high-tension metering for operating conditions. A German development in bushing-type current transformer using a small amount of iron was reported as having improved characteristics and greater adaptability to smaller amounts of primary current than the usual type. The Niagara current transformer was mentioned, but no members present could report experience with it. A double-winding current transformer designed to be immersed in the oil of a switch tank was exhibited by J. S. Thompson of the Pacific Electric Manufacturing Company.

An inverted current transformer for use in measuring high-tension voltages

was proposed by Mr. Lindblad. In this scheme the leakage current of a string of insulators would be utilized to obtain a meter indication proportional to the voltage of the line.

Data are being collected by the subcommittee headed by C. F. Gilcrest, San Joaquin Light & Power Corporation, on the proper size of meters for various installations. No report was available at this time.

The use of iron-clad installations relative to meter testing as applied to 2,200-volt installations of The California Oregon Power Company was reported by R. S. Daniels of that company. W. R. Frampton, Southern California Edison Company, is chairman of this subcommittee, but was unable to attend this conclave.

New developments were commented upon by W. C. Smith of the General Electric Company, in the absence of J. H. Paget, Great Western Power Company of California, the chairman, and he exhibited a new potential switch. The new "OB" meter was demonstrated by J. E. Bridges of the Westinghouse Electric & Manufacturing Company. This new meter has a modified terminal arrangement. The design of a new multirange potential transformer having the same curve on all ratios was announced by O. A. Knopp, Pacific Gas and Electric Company. The transformer contains a one-to-one ratio and thus may be calibrated without reference to laboratory standards.

Determination of logical meter-test periods is to be attempted by a new subcommittee headed by T. S. Capek, Pacific Gas and Electric Company. No report on this work was available at this session.

The St. Louis meetings of the Technical National Section held Oct. 20, 21, and 22 were discussed in a report read by W. H. Talbot, San Diego Consolidated Gas & Electric Company.

Pacific Coast practices as of interest to the national meter committee furnished the concluding topic for discussion.

Prime Movers Bureau

C. E. Steinbeck, chairman, C. R. Stewart, secretary.

Discussion of various phases of the technical national prime movers committee as outlined by the chairman occupied most of the time of this bureau at the recent sessions. Assignment of certain subjects to the Pacific Coast section by the national section was confirmed. These subjects are as follows:

1—Utilization of local fuels, methods and appliances.

2—Cooling of condenser circulating water.

3—Continued work on operating code definitions.

Subjects for continued study on the part of the national subcommittee on condensers were suggested as follows:

1—The prevention of algae growth in cooling systems.

2—Surface condenser operation, performance, etc.

3—Electrolytic protection of condenser tubes and stopping of troubles due to ground currents.

Thorough discussion of all six of the above subjects took place at the meeting.

Mechanical oil-burner experiences were reported upon by all member companies. All reports were very complete and will be presented to the national committee for publication.

Steam-plant mechanical equipment was also a subject upon which all member companies reported. Time permitted the discussion of only the report covering the new Long Beach Plant of the Southern California Edison Company.

Inductive Co-ordination Bureau

L. J. Corbett, chairman.

Attendance at this meeting was noticeably reduced, due to the important matters under discussion at other parallel sessions.

Differences in practice in various parts of the country were noted particularly by the chairman in his report of the St. Louis meeting of the national committee. The code of "Principles and Practices" was spoken of as working out well in the East under their varied and unstandardized conditions.

Recommendation that studies of inductive co-ordination matters be placed under the inductive co-ordination committee instead of under separate and independently appointed project committees, as has been done on current work, was made to the national executive committee at the national meeting.

Radio interference is a matter which is assuming importance. This is a new problem confronting the industry, and the co-ordination committee this year will compile data on methods and apparatus used by central station companies for locating power line leaks.

Cooperation of the local bureau with the national bureau is asked in the following ways:

1—Reporting existing parallels with communication lines, co-ordination methods used and results.

2—Reporting cases of radio interference complaints, methods and equipment used, with photographs, and results.

Forms are provided for these reports, which should be sent as early as possible to the local bureau chairman with any comments.

P.C.E.A. Executive Committee to Meet.—The Executive Committee of the P.C.E.A. will hold a meeting in San Francisco on Feb. 19. The meeting will be called at 2:30 p.m. in the office of S. H. Taylor, secretary of the association, 527 Rialto Building.

Book Reviews

ELECTRICAL ENGINEERING

By ALEXANDER GRAY. Third edition. 448 pages; 444 figures. $4. Published by McGraw-Hill Book Company, Inc., New York, N. Y.

This text is based on a lecture and a laboratory course given to the senior engineering students who are specializing in branches other than electricity and who consequently have only a limited time to obtain a broad idea of the principles and practice of electrical engineering. The author states:

For such men it is necessary to emphasize the fundamental principles, and to develop the subject by elaborating on these principles rather than by the solution of mathematical equations, because only in this way can the student be given such a grip of the subject in the short time available, that he is able thereafter to make intelligent use of the data contained in the electrical handbooks, or take up with advantage a further study of the special treatises on the subject.

In this third edition the text has been revised and brought up to date by Professor Gray's assistant at Cornell University, Prof. Robert F. Chamberlain.

In the first few chapters the fundamental principles of electricity and magnetism are briefly discussed and the author then begins the treatment of the practical application of engineering principles covering the subjects of rheostats, magnetic circuits, solenoids and electro-magnets. Direct-current machinery is then taken up, chapters being devoted to the construction of direct-current machines, the theory of commutation, armature reaction, and the characteristics of direct-current generators and motors. Electrolysis, primary batteries and storage batteries are all treated, after which the text takes up the subject of alternating currents, starting with the first principles and followed by alternator construction, transformers, polyphase and single-phase motors, transmission and distribution.

The latter part of the text is devoted to a laboratory course and to problems covering the practical phases of electrical engineering.

While not complete enough to be considered a treatise for electrical engineering students, the book handles the subject of electrical engineering in a thorough manner, and all of the references to machinery apply to the latest equipment on the market. Some of the sections of the book are particularly good, such as the section illustrating the theory of commutation and the section covering alternator construction. To illustrate the windings of an alternator use is made of colored diagrams which assist greatly in showing the student the manner in which windings are placed in modern alternators.

The book should prove quite useful for the purpose intended, that is, to give students who are not specializing in electrical engineering a working knowledge of the principles involved in the construction and operation of electrical machinery. E. R. S.

Electrical Supplies Hand Book Published.—The Associated Manufacturers of Electrical Supplies has recently issued the first edition of its hand book covering general standards in use by more than one section of the association. The book is highly valuable to the manufacturing branch of the electrical industry, as well as to those concerned with electrical inspection, as it contains detailed specifications for various devices in use in the electrical business. The book also contains the roster of the officers and membership of the association.

"The Electrical Manufacture of Carbon Black".—This is the title of Technical Paper 351 issued by the Department of the Interior, Bureau of Mines. It is by J. J. Jakosky and describes the proposed type of apparatus and gives an estimate of the cost of producing carbon black from oils. The price is ten cents, and orders should be addressed to the Superintendent of Documents, Government Printing Office, Washington, D. C.

Meetings

Commercial Programs Discussed at Jobbers' Meeting

The commercial development programs of the two major central stations in California for the year 1925 were outlined before the general meeting of the Pacific Division, Electric Supply Jobbers' Association, at Del Monte, Calif., Jan. 31, by representatives of the Southern California Edison Company and the Pacific Gas and Electric Company. R. E. Fisher, vice-president in charge of public relations and sales of the Pacific Gas and Electric Company, presided. With drought conditions passed and power supply back to normal in southern California the Southern California Edison Company will launch an aggressive load-building program, according to W. L. Frost, general commercial manager of that company. A special effort will be made to secure new customers which will require only service wires and a meter, he stated.

COMING EVENTS

Commercial National Section, N.E.L.A.—
New York, N. Y.
March 17-19, 1925

Southwestern Public Service Association—
Annual Convention—Rice Hotel, Houston, Texas
May 5-8, 1925

Electrical Supply Jobbers' Association—
Annual Convention—Hot Springs, Va.
June 1-6, 1925

Associated Manufacturers of Electrical Supplies—
Annual Meeting—Hot Springs, Va.
June 8-12, 1925

National Electric Light Association—
Annual Convention—San Francisco, Calif.
June 15-19, 1925

The load-building activities of the Pacific Gas and Electric Company this year will be directed primarily toward securing those types of load which will be most beneficial in filling up the valleys in the system load curve, said J. P. Coghlan, assistant to the president of the Pacific Gas and Electric Company. High-load factor, high-power factor, off-peak loads will be those sought to accomplish the desired results. In other words he stated, "our commercial program this year will be of the selective load-building type." With the completion of the Pit No. 3 hydroelectric plant during the summer and the absorption of 25,000 kw. into the Pacific Gas system from the new Copco plant of The California Oregon Power Company early this spring, there will be an abundance of power available for industrial, commercial and domestic uses in northern California, Mr. Coghlan stated.

A resume of the 1924 commercial department activities and a survey of the plans for the coming year of the larger power companies of the eleven Western states, as compiled by the Journal of Electricity, was presented by W. C. Heston, Pacific Coast editor of Electrical World.

The meeting was the annual session of the Pacific Division of the jobbers' association and was unusually well attended from all sections of the West. At the election of officers the following were named for the ensuing year: O. B. Stubbs, Stubbs Electric Company, Portland, chairman; Harry Harper, Western Electric Company, Los Angeles, executive committeeman to sit with the executive committee of the national jobbers' association, and Albert H. Elliot, San Francisco, secretary. In addition to the regular golf tournament for the four cups, much interest centered around the "Calcutta Pool" which was held. In spite of the disastrous fire which destroyed a part of the old Del Monte Hotel during the last jobbers' meeting, Carl Stanley, manager, was able to accommodate the guests in a most satisfactory manner.

San Diego Electric Club Elects Officers for New Year

Herbert Rose, Federal Electric Company representative in San Diego, Calif., was elected to the office of president of the San Diego Electric Club at its annual meeting held Jan. 13 at the Cabrillo Cafe. Hugo Kuehmsted, of the street railway company, the only other candidate, received nineteen votes against thirty cast for Mr. Rose.

Closer contests were staged in the balloting for the offices of first vice-president and secretary-treasurer. Bruno Barth, of the Southern Electrical Company, led his opponent, H. H. Watson, of the Byllesby Engineering & Management Corporation, by one vote. Mr. Barth was elected first vice-president by a vote of twenty-five to twenty-four. C. C. Clardy, electrical contractor, won second vice-presidency by a vote of thirty-seven to thirteen over W. H. Ellison, of the street railway company. Charles Stevens, of the telephone company, defeated the incumbent, Guy Miller, of the street railway company, for secretary-treasurer by one vote, getting the odd count on a twenty-five to twenty-four ballot.

The five men elected to the executive committee are: W. A. Cyr, G. H. P. Dellmann, Al May, W. G. Boyce and Carl Wiggins. Ralph Zink, E. R. Damarus, Sam Hall, Evan Shaffer and Walter Rainey were the other men running.

Equipment Tests Exhibited Before Seattle Club.—The Electric Club of Seattle was recently entertained with moving pictures of tests of electrical equipment, taken for and sponsored by the National Board of Fire Underwriters of Chicago. The showing was under the auspices of the Seattle Fire Department.

New Mexico Electric Light Association Convention Postponed.—The annual convention of the New Mexico Electric Light Association, which was scheduled to be held in Albuquerque Feb. 16-18, has been indefinitely postponed.

Los Angeles Contractor-Dealers to Hold Annual Ball.—The Electrical Contractors and Dealers' Association of Los Angeles has set Tuesday evening, Feb. 17, as the date of its third annual electrical ball, which will be held at the Goldberg-Bosley School for Dancing, Sixteenth and Flower Streets.

Los Angeles Electric Club Holds Annual Election

At the recent annual election of the Los Angeles Electric Club the following officers were elected for the ensuing year:

President—J. E. MacDonald, Joint Pole Committee; first vice-president—B. G. Wright, Southern California Telephone Company; second vice-president—B. F. Pearson, Southern California Edison Company; third vice-president—S. E. Gates, General Electric Company; secretary-treasurer—R. J. McHugh, Garnett-Young Company; sergeant-at-arms—R. H. Manahan, city electrician; J. G. Loomer, Western Electric Company.

The following were made directors: F. E. Seaver, Los Angeles Gas & Electric Corporation; W. L. Frost, Southern California Edison Company; G. E. Arbogast, Newbery Electric Corporation; K. E. Van Kuran, Westinghouse Electric & Manufacturing Company; H. L. Harper, Western Electric Company; H. E. Sherman, Jr., Illinois Electric Company; L. E. Moselle, Los Angeles Bureau of Power & Light.

COMING PACIFIC COAST ELECTRICAL ASSOCIATION MEETINGS

Executive Committee—
Rialto Building, San Francisco, Calif.
Feb. 19, 1925

Technical Section—
Conclave and Executive Meeting—San Joaquin Light & Power Building, Fresno, Calif.
March 25-27, 1925

Commercial Section—
Conclave and Executive Meeting—San Joaquin Light & Power Building, Fresno, Calif.
April 3-4, 1925

Pacific Coast Electrical Association—
Annual Meeting—San Francisco, Calif.
June 15, 1925

Idaho Chapter of A.A.E. Holds Meeting at Twin Falls

The Idaho chapter of the American Association of Engineers held its annual meeting at Twin Falls, Idaho, Jan. 15 and 16. The program included the annual address by J. P. Congdon, the outgoing president; an address by J. A. Harader, secretary of the Idaho Chamber of Commerce, of Pocatello; an address by W. H. Gibson, of Boise, member of the Idaho public utilities commission; an address by L. R. Cook, of Nampa, Idaho, on "The City-Manager Plan and its Application to Idaho;" an address by G. C. Baldwin, United States Geological Survey engineer, on "Snake River Water Distribution;" an address by Dana Templin, of the United States Bureau of Reclamation, on "Construction of the American Falls Dam and the Effect of Additional Stored Water in the Snake River Valley." Dean I. C. Crawford, of the University of Idaho, also spoke on the water resources of the State of Idaho.

Declaring a period of prosperity is spreading over the country and that the slump is past in the State of Idaho, Mr. Congdon in his address stressed the need for optimism and the need to look to the future with confidence. The railroads, said Mr. Congdon, will spend approximately a billion dollars a year for the next ten years, while the electrical companies will be forced to spend approximately $600,000,000 a year for the next few years to meet improvements long needed.

Personals

John C. Campbell, for thirteen years associated with the Pacific Power & Light Company, Portland, Ore., resigned Feb. 1, 1925, to accept a position with the securities department of the Electric Bond & Share Company, New York City. In his new position he will have headquarters with the Memphis Power & Light Company, Memphis, Tenn., a subsidiary of the Electric Bond

JOHN C. CAMPBELL

& Share Company. Mr. Campbell was born in Kansas City, Mo., in 1881. At the age of nineteen, after having graduated from the public schools and completed a course in a business college in that city, he went to work for the Pacific Express Company and remained in that and other employment in his home city for four years. In 1904 he removed to Portland, Ore., where he spent four years as assistant cashier of the Southern Pacific Company, and three years with Tull & Gibbs Furniture Company. Seven years later he entered the employ of the Pacific Power & Light Company. Here he directed the statistical department until May, 1918, when he was promoted to the position of traveling auditor with headquarters at Yakima, Wash., retaining that post until the present time.

R. L. Stewart, local manager at Cottage Grove, Ore., for the Mountain States Power Company, Albany, has been elected president of the Cottage Grove Commercial Club for 1925.

R. M. Bleak, superintendent of lighting and appliance sales, Utah Power & Light Company, Salt Lake City, Utah, was re-elected secretary-treasurer of the Rocky Mountain Electrical Cooperative League at the last election. Mr. Bleak has held that office in the league since its organization in 1920.

W. E. Creed, president, Pacific Gas and Electric Company, and president, Columbia Steel Corporation, San Francisco, was the principal speaker at the seventh annual dinner conference of the Utah Associated Industries held recently in Salt Lake City. His subject was "The Fruits of Collective Thinking."

Clarke F. Edwards, who has returned to Los Angeles after a six months' sojourn in the East, has been appointed representative of the Majestic Electric Appliance Company for southern California, with headquarters in Los Angeles. Prior to his departure for the East, Mr. Edwards was manufacturers' agent, representing several glass and other fixture manufacturers.

R. Wolfsberg, formerly manager of the Los Angeles branch of the Allied Industries, Inc., has recently severed his connection with that organization and is now a manufacturers' representative with offices in Los Angeles and San Francisco.

J. O. Case, assistant manager of the Los Angeles office, General Electric Company, recently spent several days in Phoenix and other Arizona points with the representatives of that company in the Arizona territory.

G. E. Emmons, retired vice-president of the General Electric Company, has recently moved to Pasadena, where he plans to make his future home. Mr. Emmons was formerly vice-president in charge of manufacturing at the Schenectady Works.

Frank J. Gleiss, formerly Pacific Coast representative of the Line Material Company, South Milwaukee, Wis., has been appointed district manager for the company in this territory and will have full charge of the firm's branches in Los Angeles and Oakland, Calif., and Portland, Ore. Mr. Gleiss recently returned from South Milwaukee, where he attended a sales convention.

P. B. Garrett, general engineer for the San Francisco office of the Westinghouse Electric & Manufacturing Company, recently returned to that city after an extended trip throughout the company's entire Western territory. In Salt Lake City, Boise, Denver and Pueblo Mr. Garrett spoke on supervisory control and also on the klydonograph, the latest form of wave meter.

G. C. Ward, vice-president in charge of operation and construction, Southern California Edison Company, Los Angeles, was a recent visitor to San Francisco.

T. D. McMullin, of the Atlantic Pacific Agencies Corporation, San Francisco, recently left for the East to visit various factories which his firm represents on the Pacific Coast.

R. E. Smith, advertising manager, Southern California Edison Company, Los Angeles, recently made a short business trip to San Francisco. While there he attended the weekly luncheon meeting of the San Francisco Electrical Development League.

R. M. Davis, statistical editor of Electrical World, New York, addressed a joint meeting of the Denver section, A.I.E.E., and the Electrical Cooperative League in that city during his recent tour of the West. He also gave an illustrated talk before the members' council of the Denver Chamber of Commerce.

Alvin J. Fisher, vice-president in charge of manufacturing, Hurley Machine Company, Chicago, has been on the Pacific Coast recently conducting a series of talks to salesmen with relation to the small household ironer which his company is putting on the market.

M. P. Rice, manager, publicity department, General Electric Company, Schenectady, N. Y., spent some time in San Francisco a short while ago.

F. S. Mills, who has been Pacific Coast representative of Curtis Lighting, Inc., Chicago, Ill., has been made vice-president and general manager of the newly organized Curtis Lighting, Inc., of California.

S. Smith Stevens, son of the late Stanley S. Stevens, who, upon the recent death of his father became manager of the Stevens Sales Company of Salt Lake City, Utah, has left for France to be gone about three years. Thad Stevens, formerly with the Inter-Mountain Electric Company, a brother of Stanley S. Stevens, has assumed active management of the Stevens Sales Company. This firm deals in Bryan-Marsh lamps and Byron-Jackson pumps.

Carl F. Wolf of the Valley Electrical Supply Company, Fresno, Calif., was a recent Los Angeles visitor.

George T. Hibbert, Jr., extension clerk in the Astoria, Ore., district organization of the Pacific Power & Light Company, Portland, Ore., has been promoted to be district manager at Toppenish, Wash. He succeeds **Glen L. Corey,** who has been transferred to The Dalles, Ore.

John L. Busey, formerly manager, Butte Electric Supply Company, Butte, Mont., is now affiliated with the Pacific States Electric Company, with headquarters in San Francisco.

Arthur Isbell, Radio Corporation of America, San Francisco, was a guest at a recent luncheon meeting of the San Francisco Electrical Development League.

C. B. Kenney, vice-president of the Ne Page-McKenny Company, and manager of the San Francisco branch, has been elected president of the San Francisco Electrical Devolpment League. "Cap" Kenney, as he is known to the electrical fraternity, has been engaged in the electrical industry for over twenty years, having started in 1903 as

C. B. KENNEY

a wireman in the employ of David Cronin, one of the first electrical contractors in the State of New York. Four years later he came to California and some time after he went to Seattle. At the time of the organization of the Ne Page-McKenny Company in that city in 1911 he joined the firm, and in 1914 removed to San Francisco where he opened for the company the office of which he has ever since been manager. Mr. Kenney was born in the State of New York and educated at Syracuse University.

C. P. Wallis, formerly with the Torrington Company, Torrington, Conn., has joined the sales force of the National Lamp Works of the General Electric Company, Oakland, Calif.

E. E. Walker, sales engineer, British Columbia Electric Railway Company, Ltd., was a recent visitor in San Francisco.

Lawrence W. Davis, general manager, Association of Electragists, International, with headquarters in New York, was the guest of honor at a luncheon tendered him by San Francisco members of the California Electragists in that city Feb. 9.

C. J. Hancock, manager for the Public Service Company of Colorado in the Clear Creek region, has been elected vice-president of the Bureau of Mines ando Commerce in Idaho Springs, Colo.

V. L. Board, general superintendent, Public Service Company of Colorado, Denver, has been elected a member of the board of directors of that company. He was also recently re-elected secretary-treasurer of the Rocky Mountain Committee on Public Utility Information. He was largely instrumental in organizing the committee and has held the office of secretary-treasurer since that body was formed. Mr. Board entered the utility field immediately upon his graduation from the University of Missouri in 1910, joining the organization of the Denver Gas & Electric Light Company as junior engineer. After remaining in Denver two years, he was transferred to the office of the Doherty interests in New York, where he was engaged in engineering and rate work. In 1917 he returned to Denver on an assignment covering special work for the gas and electric company, and five years later was appointed assistant general manager, a newly created position. About six months later he was named general superintendent, retaining that title when the Denver Gas & Electric Light Company was merged with the Western Light & Power Company of Boulder to form the Public Service Company of Colorado. In addition to his work in the electrical industry, Mr. Board is active in the civic affairs of Denver and has served as a member of the industrial development board of the Denver Civic and Commercial Association. He is a member of the American Institute of Electrical Engineers and of Sigma Xi and Tau Beta Pi, honorary engineering fraternities.

V. L. BOARD.

J. M. Curtin, manager industrial department, Westinghouse Electric & Manufacturing Company, East Pittsburg, Pa., arrived recently in Seattle for a conference with local representatives of the company.

Wm. F. Raber, general manager, **L. M. Klauber,** general superintendent, and **A. E. Holloway,** superintendent of the commercial department of the San Diego Consolidated Gas & Electric Company, the latter acting also for the San Diego Chamber of Commerce as its president, welcomed the representatives of the American Gas Association upon their visit to San Diego, Feb. 3, following the convention with the Pacific Coast association in Los Angeles.

W. C. Sterne, general manager of the Arapahoe Power & Light Company and other affiliated companies with headquarters in Denver, was re-elected chairman of the electrical bureau of the Denver Chamber of Commerce at the recent annual meeting of that body. **S. W. Bishop,** manager of the Electrical Cooperative League, was named vice-chairman for the second time, and **George E. Lewis,** manager of the Rocky Mountain Utility Information Committee, was again chosen as secretary and treasurer.

Franklin T. Griffith, president of the Portland Electric Power Company, and also president of the National Electric Light Association, and **Guy W. Talbot,** president of the Pacific Power & Light Company, both of Portland, recently traveled together to Chicago to attend a meeting of the public policy committee of the National Public Relations Section of the N.E.L.A.

W. Wesley Hicks, electric air-heater manufacturer of San Francisco, has announced the issuance of U. S. patent No. 1,518,067, which broadly covers the basic invention made by him.

E. P. Lovejoy, Jr., of the News Bureau of the General Electric Company, has been transferred from Schenectady to New York City, to represent the publicity department at the executive offices of the company.

Harry S. Delancie, for the past fifteen years associated with the San Francisco office of the Westinghouse Electric & Manufacturing Company in the industrial sales department, has joined the staff of Maydwell & Hartzell, Inc., of that city, as sales engineer.

Martin E. Fibush, San Francisco manager for the Connecticut Electric Manufacturing Company, Bridgeport, Conn., recently returned from an extended visit at the factory where he attended the annual sales conference.

Clare N. Stannard, vice-president and general manager, **G. W. Faller,** assistant vice-president, and **John E. Loiseau,** secretary, respectively, of the Public Service Company of Colorado, have returned to Denver from an extended conference with officials of the Doherty company in New York.

E. A. Phinney, of the Jefferson County (Colo.) Power & Light Company, and **George E. Lewis,** manager of the Rocky Mountain Committee on Public Utility Information, attended the meeting of the N.E.L.A. Public Relations Section in Chicago recently as representatives of the Rocky Mountain division.

Curtis B. Hawley, vice-president and general manager, the Inter-Mountain Electric Company, Salt Lake City, and president of the Rocky Mountain Electrical Cooperative League, spent some time in San Francisco lately.

Herbert Rose, Federal Electric Company representative in southern California, was elected president of the San Diego Electric Club at its annual meeting recently. Mr. Rose was graduated from the Armour Institute, Chicago, in 1909, with the degree of bachelor of science and electrical engineer. For some years after leaving college he was active in general engineering and construction work, principally with Swift & Company of Chicago, with whose organization he was associated for eight years as construction engineer. During the World War he was made manager of a plant established by the government in the Ozark Mountains in Missouri to furnish chemicals necessary for the fireproof coating of army airplanes.

HERBERT ROSE

Shortly after the close of the war he came to California and entered upon his duties with the Federal Electric Company. Mr. Rose has been associated with many local projects in San Diego, and has been particularly active in the Electric Club. He served as vice-president of that organization during 1924, and made a most successful chairman of the program committee during the preceding year.

Harry J. Martin, president of the Seattle Electric Club, recently paid a visit to San Francisco.

Obituary

John R. Dee, consulting engineer, The Pacific Telephone & Telegraph Company, Seattle, Wash., fell to his death from a third-story window in his apartments recently, following a fainting spell. Mr. Dee was a member of the American Association of Engineers.

Alphonse Forsman, engineer and electrician at the Olympia Veneer Company's plant, Olympia, Wash., was electrocuted recently when he threw a switch in the floating dragsaw plant in the mill pond, dying twenty minutes later. He is said to have been standing in a few inches of water.

Lynn B. Easton, manager of the Laidlaw Works of the Worthington Pump & Machinery Corporation, New York, died at Cincinnati, Ohio, Jan. 24, 1925.

TRADE NOTES

The Liberty Gauge & Instrument Company, Cleveland, Ohio, has announced its removal to 6612 Euclid Avenue, that city, where the capacity will be twice that of its former quarters.

The Electric Service Supplies Company, Philadelphia, Pa., has announced that it has assumed the exclusive sale and distribution of the entire output of the Franklin Porcelain Company, Morristown, Pa., manufacturers of high-voltage porcelain insulators and fittings. Western representatives of the firm are: F. H. Bodler, San Francisco, Calif., A. W. Arlin, Los Angeles, Calif., and Franklin Sales Company, Denver, Colo.

E. H. Freeman Electric Company and **Trenton Porcelain Company,** both of Trenton, N. J., have announced their consolidation under the name of Circle F Manufacturing Company. No change in management, organization or business policy is contemplated.

The Sangamo Electric Company, Springfield, Ill., has opened a direct sales office at 19 Pearl Street, Boston, Mass., where a complete stock of meters and accessories has been placed to render adequate service in the New England territory.

The General Electric Company, Schenectady, N. Y., has issued Bulletin No. 48941A, entitled "CR-9006 Enameled Resistor Units." This is a well illustrated booklet describing the uses and advantages of these units and giving standard ratings and dimensions. Applications are given for several different fields of service. The bulletin contains eighteen reading pages.

The R. Thomas & Sons Company, East Liverpool, Ohio, recently issued an attractive four-page booklet to commemorate the close of its fiftieth year in business. Illustrations of events in the early stages of electrical development make the pamphlet particularly interesting.

The F. W. Wakefield Brass Company, Vermilion, Ohio, has recently developed "Red Spot" kitchen unit No. 1171-PI, which it is claimed embodies a sturdy and approved method of attaching convenience outlet at very low cost and with the minimum expense for installing. A metal channel is screw-bolted to the porcelain enameled steel canopy, which in turn is rigidly clamped to a heavy steel strap. The outer extremity of this channel is screwed to the ceiling, giving solid support to the three-conductor drop cord which terminates in a plug-in switch. The unit is shipped complete except glassware.

The George W. Dunham Corporation, Utica, N. Y., has been incorporated recently to manufacture electrical labor-saving appliances. It will market as its initial product an electric centrifugal washer and dryer. It is planned to add shortly other lines, each to fill a certain place in the growing demand for labor-saving equipment.

A. Schleuter & Company, Oakland, Calif., is now featuring Johnson Impeller washers, which are made in that city.

The Rome Wire Company, Rome, N. Y., has announced that it has been granted patent No. 1,520,680, covering its new non-metallic armored cable "RomeX".

Western Electro-Mechanical Company, Oakland, Calif., has prepared a pamphlet, "Automatic Substation Equipment," covering its Type S2 and Type S3 reclosing mechanism and Type SS relay. It is well illustrated with cuts and charts.

The Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has recently applied the sheet-metal case construction to its distribution transformers of 6,900, 11,500 and 13,800-volt rating. Hitherto, the sheet-metal construction of transformer cases was limited to distribution transformers for 2,300-volt service. The substitution of the sheet-metal parts for the cumbersome cast-iron parts formerly used effects a great reduction in weight and physical dimensions, and at the same time increases the strength and ruggedness of the transformer.

The Manchester-Moneta Electric Company is the name of a new electrical store opened a short time ago at 305 West Manchester Street, Los Angeles, by J. S. Richards and R. E. Gansert. In addition to contracting, the firm will stock a complete line of fixtures and appliances.

J. T. Fagan has recently developed a carrier for spare Mazda automobile lamps designed to permit the autoist to carry extra lamps in a convenient and safe manner. The holder is attached to the instrument board of the car and swings up under the board so that it is out of sight. Lamps are placed in blind sockets in the carrier and are subjected to no undue vibration. When a lamp is needed the carrier is pulled down, the lamp detached and the carrier is pushed back again out of the way. Two types of carriers are offered, one with a capacity of four lamps and the other with space for seven. The carriers are made of metal, finished in black, and each socket is designed for a particular type of spare lamp. The devices are being distributed by Asch & Company, 23 West 60th Street, New York.

U. S. Electrical Manufacturing Company, whose executive offices and works are at 200 E. Slauson Avenue, Los Angeles, and branch office and warehouse at 583 Howard Street, San Francisco, has published the initial number of "U. S. Motor News," a monthly good-will booklet of four large pages designed, according to its foreword, to pass on a reflection of the spirit of the organization, to introduce to one another its friends in its wide territory, and to present information about Western industries and their relations with the East as well as the West. The sheet is well printed and illustrated.

The Ambassador Electric Company, 2717 West Seventh Street, Los Angeles, has been recently established by F. R. Stone, formerly manager of the Eagle Electric Company of that city. The concern will merchandise radio and electric appliances.

Even Los Angeles comes to Del Monte to learn from San Francisco how to take movies, admit Harry Harper, district manager, Western Electric Company; "Shorty" Sherman, sales manager, Illinois Electric Company; "Newt" Graham, Graham-Reynolds Electric Company, and "Charlie" Listenwalter, Listenwalter & Gough, all of Los Angeles, who are receiving instruction from "Sandy" Sanderson, Pacific Coast manager, Bryant Electric Company, and Roscoe Oakes, manager National Carbon Company, both of San Francisco.